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CIRCULATORY FAILURE IN HÆMORRHAGE AND SHOCK*

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I SHALL confine my remarks very largely to circulatory failure due to hæmorrhage and speak but briefly of circulatory failure due to what is generally described as "shock".

Before reviewing the clinical aspects and treatment of partial or complete circulatory failure due to the sudden loss of a considerable volume of blood, it would be well to review in part our present understanding of the physiology of the cardiovascular system. Modern methods of physiological research have yielded accurate knowledge upon several important points.

We now know (1) that the blood volume is equivalent to from 1/20 to 1/13 of the body weight, or about five litres; (2) that the normal output of the heart is about five litres per minute per ventricle when the individual is at rest, with a factor of safety of from six to eight; (3) that the "stroke volume" or normal output per beat is approximately 60 c.c. or 2 oz. per ventricle, rising to 100 c.c. in exercise.

These facts bear directly upon Starling's "Law of the Heart", which is concerned with the effect of diminished blood volume on the force of the heart beat. It has been shown that the contractile power of the heart muscle varies with the volume of the heart at the end of diastole. This is the expression of a general principle which holds good for the cardiac muscle as well as for all voluntary muscles, namely, that within physiological limits the force of contraction of a muscle varies with its initial length. With the foregoing facts in mind we will more readily understand that, if the blood volume be suddenly lessened, the venous return is necessarily diminished, with the result that the heart is insufficiently distended in diastole to call forth forcible contractions. These weakened contractions soon fail to supply the vital centres, which react to moderate anoxæmia by accelerating the heart rate and constricting the peripheral vascular bed. Vaso-constriction, however, fails to raise the blood pressure, because the vessels are already partly empty. No matter how fast the heart rate becomes, the output per minute is not increased, because, according to Starling's law, the beats, though rapid, can not be forcible unless the heart is first fully distended by an abundant venous return.

Now, how is this physiological knowledge applied in the treatment of hæmorrhage? Before taking up the question of treatment, let us first very briefly define the causes of circulatory failure following sudden excessive hæmorrhage.

(1) Mechanical: the result of diminished blood volume (lowered blood pressure, defective coronary and cerebral circulation).
  (a) Lowered venous return.
  (b) Weakened systole.
(2) Nutritional: tissue anoxæmia, again primarily cardiac and cerebral.

Only a very brief review of the symptoms is here necessary. The subjective symptoms are, weakness, prostration, restlessness, and thirst: the objective, pallor (most striking in serious cases), rapid shallow respirations, small rapid compressible pulse, reduced surface and body

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temperature, sweating, failing consciousness, low blood pressure, and diminished renal secretion.

Here one might interject a remark regarding surgical shock due to gross injuries, compound fractures without loss of blood and extensive burns, presenting much the same syndrome. In surgical shock, however, the status of the patient is quite different. It is true that there is a low blood pressure, and a diminished blood volume is stimulated by the splanchnic engorgement. On the other hand, owing to the "barrage" of afferent painful impulses which follows upon the injury, respiration is stimulated to such an extent that the carbon dioxide of the blood, because of over-ventilation, falls below the normal threshold stimulating value of the respiratory centre, so that respiration is really maintained by the impact of these afferent impulses upon the cerebral centres. This fact gives a clue to the proper surgical conduct of these cases, a clue which was overlooked until the work of Yandell Henderson of Yale appeared. In all such cases suffering from acapnia the exhibition of morphine or the administration of a general anæsthetic is contra-indicated, because the arrest of the painful afferent impulses may lead directly to respiratory failure. It was long ago clinically recognized that primary amputations following injury should never be undertaken, because of the very high death rate, but we had to await the researches of Henderson to understand the mechanism of death in such cases. We are indebted, also, to Yandell Henderson for his advocacy of the use of carbon dioxide in surgical shock, a practice which has within the past five years become universal.

Now to return to the question of treatment of shock due to hæmorrhage.

1. First a word as to Nature's method of attempting to repair a deficiency in blood volume. Following hæmorrhage there occurs a pouring out of body fluids into the circulatory channels, the blood volume is increased, the tissues dehydrated. This method is effective in the majority of cases of hæmorrhage, or at all events would prove ultimately effective if artificial assistance to the circulation were withheld. In moderate hæmorrhages the blood volume may be restored within 24 hours.

2. Of active measures which may be undertaken bandaging of the extremities, with elevation of the foot of the bed compensates in a measure for the loss in blood volume and improves venous return, in both instances responding to the physiological demands. Priestley has proven that it is impossible to improve the blood volume by drinking water, but, because of the dehydration and thirst, the administration of water is a measure very essential to the comfortable passive recovery from hæmorrhage.

3. Intravenous saline injections. The essentials of this measure are a salt solution which is isotonic with the blood, which is neutral in reaction, and which is sterile. The clinical and physiological results of such injections are:

1. A moderate temporary rise in the arterial blood pressure, an improvement in colour, a fall in the pulse rate, an increase in pulse volume, and an improvement in the nutrition of the central nervous system.

2. Temporary rise in venous pressure.

3. A rise in the capillary pressure.

4. An increase in the "filtration pressure", which is made up of: (a) the hydrostatic pressure within the capillaries; and (b) the osmotic pressure difference between the fluid in the capillaries and that in the tissues. (The filtration pressure is the product of three variables: (a) hydrostatic pressure within the capillaries; (b) osmotic pressure of the fluids within the capillaries; and (c) osmotic pressure of the fluids outside the capillaries.) Intravenous saline injections increase the hydrostatic pressure within the capillaries, but decrease by dilution the osmotic pressure within the capillaries. Hence this fluid tends to escape from the vessels into the tissue spaces. In this latter feature lies the weak link in the applied physiology, and, while the colloids contribute only about 40 mm. of mercury toward the six atmospheres of osmotic pressure, it is the relative reduction by dilution of this protein osmotic pressure which the saline injections fail to repair. To meet this physiological demand the use of gum acacia has recently been revived. The accepted formula is 6/10 per cent of gum acacia in isotonic or 9/10 per cent saline. This amount of colloid tends to lessen the escape of the saline or crystalloid elements from the blood vessels into the tissue spaces. Recent results in the use of intravenous saline combined with gum acacia have been most encouraging, in that this formula raises and

maintains the blood pressure more effectively and ensures a more rapid restoration of normal blood volume.

Finally, and of most importance, is blood transfusion. It is mentioned last because in emergencies it is not immediately available. When available, it is in grave hæmorrhage the method of choice, because it replaces in quality and may restore in quantity the actual loss in blood volume. Its effects are not evanescent, as are those of purely chemical replacements, and in addition there is abundant clinical evidence to support the belief that, where the quantity falls short of normal requirements, blood transfusion stimulates new blood formation.

In conclusion, we may then assume that the clinical methods now practised for the relief of hæmorrhage adhere closely to the physiological requirements of the circulatory apparatus as determined by physiological experiment.

CIRCULATORY FAILURE IN ACUTE INFECTIOUS DISEASES: TYPHOID, DIPHTHERIA, SCARLET FEVER, AND MEASLES*

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CIRCULATORY failure in the acute infections may develop in three ways:

First, from acute toxæmia, such as occurs in the severe overwhelming infection of toxic scarlet fever.

Second, from exhaustion as a result of a prolonged fever, well exemplified by typhoid.

Third, from the action of some specific toxin, the best example of which is seen in diphtheria.

While the nature of cardiovascular failure depends somewhat upon the individual infection, in all of them in varying degrees, all three factors, degeneration of the heart muscle, poisoning of the vasomotor centres, and failure of tone of the arterial wall are concerned.

Acute Toxæmia

Toxic scarlet fever gives us the characteristic picture of acute circulatory failure. Clinically, the diagnosis is often difficult if no history of exposure is obtained. The child may get out of bed apparently well; during the morning, it is attacked by violent vomiting, develops a sore throat and high fever in a few hours, and often goes into a convulsion. The rash may not appear for some hours and when it does it has not the usual scarlet fever colour, but is of a dusky cyanotic shade and easily missed. There is intense toxæmia from the outset and the patient quickly goes into a condition closely resembling that found in surgical shock: rapid thready pulse, low blood pressure, pallor changing to cyanosis, rapid shallow respiration and delirium followed in most instances by suppression of urine, coma and death.

Death then during the first few days of scarlet fever, as in any of the other acute infections in which an overwhelming toxæmia occurs, is, we believe, due to poisoning of the medullary centres rather than a result of acute myocardial changes and must be combated by measures directed to overcoming the infection and staving off circulatory failure.

If a specific treatment is possible, as is now the case with scarlet fever, this must be adopted at the earliest moment, otherwise the damage is done and the patient will fail to respond.

Of general measures, hydrotherapy is the foremost, and is indicated in the form of tepid spongings, or wet packs and forced fluids by mouth, together with an icebag to the head. Ker is opposed to cold packs in these severe cases of scarlet fever, even if hyperpyrexia be present, believing that the essential thing is to get a good skin reaction. Hydrotherapy, may be further employed in the form of a normal or glucose saline intravenously. This we believe is the most rational treatment in this type of infection and the most likely to be successful.

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Transfusions we believe are not so satisfactory in this type of acute toxæmia unless the donor's serum be that of a convalescent scarlet fever patient. Of other measures, good nursing, plenty of fresh, pure air and judicious stimulation may in the occasional case help tide the patient over the crisis of the first few days.

Of the stimulants, Ker of Edinburgh recommends alcohol as the best, largely for its action on the skin, and suggests that it be supplemented by strychnine and camphor. Here as in all cardiovascular failure which is not strictly myocardial, one would imagine that adrenalin would be the proper drug, but in practice it is of little value on account of the evanescent nature of its action. Caffeine is much used but has the disadvantage of being a cerebral stimulant to these already restless patients.

Treatment, then, in this type of overwhelming infections offers us very little encouragement, except in so far as an antitoxic serum may be available, and only then if early diagnosis and prompt and efficient measures are taken.

Prolonged Exhaustion

When we turn to typhoid fever and the type of failure resulting from its prolonged and exhausting toxæmia, we have an entirely different picture and one with a much more cheerful outlook. Here the heart muscle plays a larger part. As is well known, hyaline degeneration occurs in the skeletal muscles during severe typhoid, and a parenchymatous degeneration of the heart muscles frequently accompanies it. Although commonly the function of the heart is not seriously affected, in the bad cases there is abundant evidence of cardiac asthenia in the low blood pressure and the low tension, soft, often dicrotic pulse. If the pulse gradually becomes rapid—above 120—and irregular, especially if at the same time the first sound of the heart becomes weak, and an apical systolic murmur develops, cardiac failure is imminent.

What can be done to forestall or overcome this collapse? Nowhere is the axiom, "Prevention is better than cure" more applicable than here. It is the toxæmia which causes disaster; not the overwhelming type of poisoning seen in toxic scarlet fever, but a gradually developing progressive form which gives one some opportunity to forestall it. Our endeavour should be to combat the toxæmia from the beginning and thereby avoid the threat of circulatory failure. Once again, hydrotherapy is our sheet anchor. The first essential is forced fluids by mouth (and if the patient is restless and difficult they may be given as rectal salines). At least three, and better, six quarts daily should be insisted upon. Sponges, ice packs, or tub baths should be given patients with a temperature of 102 2/5 or over. These are not given primarily for the effect on the temperature, but for that which they have on the nervous system and the circulation.

The nervous symptoms are frequently entirely eliminated, while to the vasomotor system hydrotherapy is a great stimulant. The heart rate usually falls, the pulse becomes smaller and harder and the blood pressure rises.

Does the circulatory system need stimulation as a routine in typhoid fever? I think we are all agreed that it does not, except in so far as hydrotherapy can be considered as such. A pulse becoming rapid and irregular, or a weakening of the first sound of the heart at the apex, or a falling blood pressure, all are danger signals.

What stimulants should be used in typhoid fever has been the source of much discussion, but it is striking how universal is the opinion of authorities that alcohol is a good drug in this disease. It certainly combats the toxæmia and whether it is a true circulatory stimulant or not—probably not—the patients seem to use it and be benefited by it. Strychnine which improves the vascular tone is the other stimulant on which we can rely with most satisfaction.

Is digitalis of benefit here? In these cases of failing heart many clinicians are convinced that digitalis is of value; others feel that its action is equivalent to the whipping of a tired horse and that the condition is in some respects analogous to the failure in diphtheria. In this city we have had an insufficient number of cases since the newer views on digitalis therapy have been accepted from which to arrive at any satisfactory conclusion.

Specific Toxin

Diphtheria is in a unique position among the infections because of the selective affinity of its toxins for the heart muscle and the nervous system. As you are all aware the diphtheria

bacillus remains for all practical purposes at the original site of infection, but pours out its toxin into the lymph stream and it is this toxin which causes the circulatory failure. The heart often suffers severely from the first in a bad case of diphtheria. A fatty degeneration of the muscle fibres occurs early; it begins as very minute fat globules; later changes to larger fat globules, and still later if the toxæmia is intense enough, results in complete destruction of many individual fibres. The toxin of diphtheria also has a selective affinity for the peripheral nerves and may attack the vagus. This is considered by many the explanation of those cases of sudden death seen late in convalescence in association with paralysis elsewhere in the body.

Probably, however, the most important effect of the diphtheria toxin is its action on the vasomotor apparatus, whereby the tone of the arteries is weakened, allowing the blood pressure to fall and the whole heart to suffer acutely from lack of nutrition, or causing embarrassment of the cardiac action through loss of tone in the peripheral circulation.

The signs of circulatory failure must be watched for in every case of diphtheria, but those in which one can almost with certainty predict its onset are the late cases, *i.e.*, those in whom antitoxin is not employed until after the third or fourth or even a later day of the disease, and especially in those cases in which the organism is situated in the pharynx. These patients present a typical picture when first seen. They are listless and pale, and have a very fetid odour to the breath and a tremendous enlargement of the lymphatic glands in the neck. The temperature is usually little above normal and the pulse is rapid, soft and of low tension. Under large doses of antitoxin they appear to improve rapidly, the temperature drops, the throat clears and the lymphatic glands in the neck subside. But albumen becomes marked in the urine about the seventh or eighth day of disease and the pulse becomes more rapid, scarcely palpable and a little irregular. Sometimes the pulse during the second or third week will suddenly become much slower instead of more rapid, indicating the occurrence of heart block; an equally bad omen.

The onset of vomiting is indicative of advanced failure, and if accompanied by gallop rhythm and dilatation of the heart indicates a fatal issue. The extreme pallor, the restlessness, the cold extremities, and the rapid fall of blood pressure, all point to loss of vascular tone as the chief factor, and one which will embarrass a degenerated heart muscle beyond its power.

Cardiac failure may also occur unexpectedly during the first fortnight as a result of a sudden or undue exertion, such as sitting up in bed; or it may occur at almost any time during convalescence, and especially in those cases showing any signs of paralysis. Authorities differ as to the factor in these late cases, many claiming, others denying, that death is due to changes in the vagus.

But this doleful picture should be entirely effaced under efficient and early treatment. There should be no deaths from diphtheria, whether circulatory or otherwise, if early recognition and efficient treatment with antitoxin were carried out.

Even when the case is seen after considerable damage is done, efficient treatment will save many lives. Large doses of antitoxin, partly intravenous and partly intramuscular should be given immediately in sufficient quantity so that no further injections are needed.

While the occurrence of myocarditis in such is largely determined before the case is seen, the outcome will often be decided by the protection the heart receives during the course of the disease and during convalescence. It is of the utmost importance that the patient be kept in the recumbent posture from the onset; even the slightest exertion should be strictly forbidden. At the Alexandra Hospital even the mildest cases are kept absolutely flat on their backs for one week or ten days, after which one pillow is allowed; at the end of two weeks a second pillow is given and the patient sits up about the twenty-first day. More severe cases are kept proportionately longer, and especially those cases showing any sign of peripheral neuritis. If symptoms of heart failure supervene what can be done?

Stimulants are of little, if any, use here, especially the digitalis group. Their action is equivalent to the whipping of a tired horse, when what is really called for is the further lightening of the load to be carried, and we agree with those who feel that digitalis may

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in this disease be more often harmful than otherwise, because of its action in indicating heart block. In these cases we make the rest as absolute as possible; the patient is not allowed to feed himself and even the bed-pan may have to be dispensed with in favour of a draw-sheet. If vomiting occurs, everything by mouth is stopped except a little ice to suck and the patient is fed rectally for the next few days. Fortunately this phase does not last long, and unless death occurs, the response is rapid.

Considering the pathological physiology of the condition, adrenalin should be beneficial, but its action is too evanescent and we have found that strychnine seems to help more often than any other drug.

The encouraging feature about those cases that are tided over the crisis is their future cardiac condition. We believe that most of them make a complete recovery; that while pathologically some fibrous tissue may result in the heart muscle, functionally it is very seldom evident later in life. There has been much dispute over this question, McCulloch of St. Louis considered diphtheria a frequent cause of chronic myocarditis later in life, but in summing up his electrocardiographic studies of the disease he admits that the evidences of myocarditis are all transitory and if the condition is not fatal they tend to disappear during convalescence. We are more inclined to agree with Cabot's view when he states, "That infectious disease has any particular connection with fibrous myocarditis except in so far as the infection may be supposed to favour the development of arteriosclerosis, we have no evidence".

In conclusion, may we not hope that with the great advances that have occurred in the prevention and treatment of these three infectious diseases during our own day, such a subject for discussion will become obsolete to our successors; that these infections having been stamped out will no longer be a cause of circulatory failure; and that treatment for this condition will be eliminated from the field of therapeutics.

Rest Homes for Rheumatic Children.—The Metropolitan Asylums Board decided at its last meeting to provide further residential accommodation for the treatment of London children suffering from rheumatic diseases, subject to the sanction of the Ministry of Health. This is to be done by extending Queen Mary's Hospital for Children, Carshalton, to the extent of 350 beds, in addition to the unit of 60 beds primarily intended for research purposes which were set apart at the beginning of last year. Consideration was given to utilizing the admirable country site at Copthorne, near East Grinstead, purchased in 1914 for the erection of a sanatorium, but this proposal was negatived on account of the high cost of installation where no public services are already laid down. The new accommodation will be for children of both sexes under 16 years of age suffering from subacute rheumatism, the later stages of acute rheumatism, rheumatic chorea, or rheumatic carditis including recurrent attacks. It is admitted that there are in London not less than 10,000 children who have suffered or are suffering from rheumatic symptoms, and in a recent report to the London County Council Dr. F. N. K. Menzies stated that there are from 600 to 700 children absent from school for long periods on account of rheumatism, representing in fact some 25 per cent of chronic invalidity amongst school children. The experiment of sending these children to ordinary convalescent homes has not proved successful; the parallel between the problem of the rheumatic and tuberculous child is fairly close and admission to recovery homes requires a careful basis of selection. The urgency of a rapid expansion of accommodation in such rest homes or hospital schools has been emphasized by the Sub-committee on Rheumatic Heart Disease in Children, appointed by the British Medical Association, whose second report has just appeared, and in this report the policy of concentration is advocated. Each city, it is suggested, should seek to develop a kind of hospital suburb or colony at the best site available, and part of this development would be the hospital school or rest home which should provide for the rheumatic child treatment as long as may be necessary in the best possible environment. In the meantime, until the necessary building is completed, 56 beds at High Wood Hospital, Brentwood, are to be allocated temporarily for the treatment of these children.—*The Lancet*, April 23, 1927.

CIRCULATORY FAILURE IN ACUTE AND CHRONIC CARDIAC DISEASES: MYOCARDITIS, VALVULAR DISEASE, AND AURICULAR FIBRILLATION*

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IN the time at my disposal, with the subject assigned to me, I will speak only in a very general way of such cardiac conditions as we find following rheumatic infections. First of all it would seem advisable to outline just what we mean by circulatory failure.

Physiologists have demonstrated that when a heart beats it exercises certain fundamental functions; *e.g.*, rhythmicity, conductivity, excitability, and so forth. These functions when exercised to excess become exhausted, but are rebuilt again in the resting period. They function interdependently. They depend one upon the other, although at times it may seem that failure of one particular function predominates. For instance in heart block we believe that conductivity is the main function involved. At rest a normal healthy heart can maintain an efficient circulation without there being any consciousness of its action, and without drawing upon the reserve power. An active young adult can actively exercise with perhaps the production of temporary symptoms such as dyspnœa or palpitation. With rest the reserve force is readily built up again to an equal capacity as before the exertion. We say then that the heart has "called upon its reserve force." Similarly, a young healthy heart can be exercised even to exhaustion, and again, provided sufficient rest is given, the reserve force is once more built up to its former power. Therefore, the possibility of "strain" resulting from excessive muscular exercise in a normal healthy heart is rather questionable, although we often hear of it. Not so, however, in the case of the diseased heart. The reserve force in this case has been cut into, and partially exhausted to such an extent that exertions, which in the normal individual produce little or no distress, can now be performed only with difficulty by drawing on the reserve force, with the production of symptoms, such as palpitation, dyspnœa, etc. If there is not ample rest given, and there occur intercurrent infections, the reserve is still further curtailed, until we have the picture so often met with—complete heart failure—the reserve force completely exhausted. The reason I emphasize this is that it is important in treating such cases to realize that it is the failure of the inherent cardiac functions, which is the important factor at work. The actual diagnosing of this or that particular valvular lesion is of entirely secondary importance. What is it that cuts down and curtails this reserve force? Infections in general, and the one I wish to emphasize more particularly this evening is the myocardial change following rheumatic infections.

In attempting to arrive at an estimate of the amount of myocardial damage I rely greatly on the patient's history. Particular attention is paid to the history of past infections, and more especially in the class of case we are now dealing with, such infections as chorea, acute rheumatic fever, and recurring attacks of tonsillitis. We next endeavour to estimate just what "load" was required to break the cardiac compensation, and special attention is given to the length of time required to again build up the reserve force. Following up the history we endeavour to ascertain the interval of time which elapsed before the next cardiac "break down," and just how much exertion or load, or what intercurrent infection caused the second relapse; and so on with any further breaks in compensation. By such means we attempt to arrive at some estimate of the reserve power. To mention "rheumatic infection" is to immediately associate in our minds an "endocarditis". We have been taught until recently to diagnose such a condition

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by the presence of a murmur. So common is it to hear systolic murmurs over the mitral or apical regions of the heart, that the term "mitral systolic murmur" has become synonomous with "mitral endocarditis." Systolic murmurs may be caused by many different conditions. Postural murmurs may be present in the prone position only to disappear in the upright position; and so-called hæmic murmurs and cardio-respiratory murmurs have long been recognized. So that in diagnosing cardiac involvement the presence of a systolic murmur at any area of the heart is unreliable and misleading. In acute infections, as acute rheumatic fever, the presence of a systolic murmur over the mitral area is not diagnostic of an endocarditis, it may be due to a simple relative mitral insufficiency. I repeat, a systolic mitral murmur is not diagnostic of an endocarditis. Stress should be laid rather on the progressive and permanent enlargement of the heart. It is an entirely different proposition in the case of the diastolic murmur. In the large proportion of cases it is directly diagnostic of cardiac impairment.

Cabot, of Boston, in his book *Facts on the Heart,* states that in 4,000 post mortems he has only found seven cases of definitely pure mitral insufficiency, uncomplicated by stenosis; he considers the systolic murmur of no diagnostic significance and states that the only sure way definitely to ascertain that there is present a mitral endocarditis is to determine the presence of a mitral stenosis. Be that as it may, the outstanding fact is that the systolic murmur as such is very unreliable.

In the treatment of cardiac disease, if we are to expect any results we must institute treatment early, especially in the young. We must attempt prophylaxis, and if this is to be of any value it must be commenced early.

First of all, the public should be more fully advised as to the seriousness of the cardiac situation, as it exists to-day. For example, one well-known insurance company advises us that every year they reject 2 per cent of the applicants for insurance on account of definite cardiac disability. For a similar reason 4.2 per cent of the draft were rejected from the United States army in the late war.

Deaths from tuberculosis have been reduced one-third. What has been done to reduce the death rate from cardiac disease? The more intelligent parents bring their children for examination. The problem is to get in touch with the children of those who are less observant, or for various reasons careless of their children's health. The following means might be adopted to detect these ailing children.

We should institute a closer school inspection. Teachers should be instructed in a general way what to look for in the early stages of cardiac disease. A careful examination should be made of those returning to school after any infectious disease. The great importance of carefully treating children with large tonsils and adenoids. Children who are manifestly backward, mentally or physically, should be carefully examined and a careful supervision should be kept over all found to be afflicted with cardiac impairment, in regard to their pastimes, their diet, and their hours of work.

In the treatment of cases of beginning cardiac failure with normal rhythm, early recognition is of great importance. We should depend more on the patient's subjective symptoms than on any actual physical sign. From the history of the case as I have indicated we should try to find out what the physical tolerance or the reserve power is, and then after we have ascertained this we should endeavour to adjust activities to meet these limitations and to teach the patient to live within his reserve power. By all means try to avoid the mental attitude which some of these patients develop, that is, the fear of sudden death. I am now speaking of the early cases with a normal rhythm.

Another important point is to protect such patients so far as possible against incidental infections; the so-called "colds," influenza, and such like, which are very apt to produce an exacerbation of symptoms either during or after the attack. Try to visualize such cases as involving one or more of the functions of the cardiac muscle rather than as pertaining to this or that particular valvular lesion.

I do not think that the use of digitalis is necessary in the treatment of early cases of cardiac failure with normal rhythm, and no marked sign of cardiac loss of compensation. In patients who present a normal rhythm but with decided loss of compensation, it goes without saying that they must be put to bed, with a back rest if necessary, and it usually is. A useful addition to this is the arm rest upon which they

may lean forward and get support. I usually follow the plan, before starting such patients on any medication, of observing them for a few days, provided their condition permits delay, so as to ascertain what the circulation can do with rest alone. By this method we obtain an estimate regarding the severity of the break in compensation. As to sleep, they must have rest, and I usually start with the milder hypnotics, such as the bromides. If these are not sufficiently strong, we work up the list; veronal, luminal, and if necessary morphine.

In the treatment of the œdema, the intake of fluid and the output should be measured and an effort made to balance one against the other. If the patient is not too sick, it is a useful procedure to weigh him every second or third day to check up the accumulation or otherwise of œdema fluid.

If digitalis is not a sufficient diuretic one may have recourse to drugs more definitely diuretic. Such suffer from the objection that their action is but temporary. If a great out-pouring of fluid follows their use, with the subsequent reaction there may be a great falling off of the quantity secreted, and the net result may not be very great. However, I believe they should be tried. There are many diuretics in common use. At present, the one most favoured is ammonium chloride in doses of 15 to 30 grains given three times a day, until the urine is strongly acid, and followed by novasurol, 1 c.c. intramuscularly every second or third day as the case may require. Caffein-sodium-benzoate given hypodermically is a good cardiac stimulant as well as a diuretic. Diuretin is also frequently used and is a mild diuretic.

If marked œdema is present with a collection of fluid in either the pleural or peritoneal cavities, I believe it to be necessary to relieve pressure and evacuate these accumulations before any decided result from either digitalis or any of the diuretics can be obtained. Multiple punctures with Southey's tubes in selected cases of marked œdema will often materially relieve the patient. Venesection is not used often enough. This procedure is particularly useful in cases where the right side of the heart is distressed, where there is considerable cyanosis, and where the veins of the neck stand out prominently owing to the increased pressure. In acute failure due to mitral stenosis, morphine and venesection will often tide over the crisis.

As regards the diet in the cases with marked loss of compensation, the Carrel diet, 800 c.c. milk in twenty-four hours, is the usual procedure. This should be maintained only for a short period, four to seven days, after which the diet usually may be increased to one relatively low in sodium chloride. In obstinate cases a completely salt-free diet may be tried. As the patient improves a wider variety of diet may be given, but with sufficient restriction of fluids to maintain a balance between the intake and the output. In this type of case, with a normal rhythm but with loss of compensation, there is some difference of opinion as to the value of digitalis. From my own experience I am quite satisfied that good results have followed its use, particularly in the so-called arterio-sclerotic type of cardiac failure. Regarding the value of the many other cardiac drugs, adrenalin in cardiac asystole, injected directly into the heart muscle, is valuable in certain emergencies; caffein-sodium-benzoate is a valuable adjunct to digitalis. The numerous other stimulants, so frequently used, strychnia, camphor, convallaria, and squills, in my opinion have little value in the treatment of the cases under consideration.

Cardiac failure with irregular rhythm is very common. Total irregularity, or auricular fibrillation, occurs very frequently in rheumatic hearts, particularly as a complication of mitral stenosis. In treating such cases in addition to the above methods already cited the one drug, superior to all others is digitalis.

In prescribing digitalis I should like to emphasize certain points. First, the various preparations of digitalis vary very much in potency. I therefore recommend the use of a standardized preparation, a preparation which has been tested and with which you have obtained results. There is nothing to be gained by the indiscriminate use of the various preparations so speciously advertised. There are many preparations of digitalis on the market asserted to contain the active principles. These also vary remarkably in their potency. Not only do they vary, but it is sometimes difficult to estimate the equivalent of digitalis leaf in any particular preparation, so that often they are prescribed in inadequate dosage. In treating fibrillation with digitalis, the principle is to obtain the full effect of digitalis and

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then stop. Digitalize your patient. There are several methods of doing so. The Eggleston dosage, or the modified one which we use, *i.e.*, one drachm of a standardized tincture every six hours until four doses have been taken, then 15 drops every four hours until sufficient effect has been obtained: afterwards sufficient only to maintain a stable rate. Usually 25 to 30 minims of the tincture or its equivalent per day will maintain this over long intervals. Another important point is to remember that children may take digitalis in relatively larger doses than the adult.

As to the intravenous use of digitalis in cardiac failure, it is indicated only in emergencies, and then only after it has been ascertained that the patient has not had the drug within the past two weeks. Failure to observe this precaution has often resulted in disaster. For use in this way, there are many preparations to choose from, and as many variations in potency.

In the treatment of auricular fibrillation there is another drug which must be mentioned; *i.e.*, quinidine. In certain selected cases, quinidine does more than digitalis; it tends to abolish the irregular rhythm. In treating auricular fibrillation it must not be overlooked that it is the myocardial failure, not necessarily the fibrillation, from which the patient is suffering. Quinidine is a drug which should never be used indiscriminately. It should never be used where there is much congestive failure; nor during the process of an acute febrile attack. It is not suitable in cases of auricular fibrillation of long standing. The patient should be checked up for any idiosyncracy to the drug, and all cases should be checked by the electrocardiograph; in short, it is better used only in hospital practice.

In the treatment of all cardiac cases in the convalescent stage, one point stands out above all others; the urgent need of a proper convalescent home. Many of our public patients leave hospital with little or no reserve power, and due to circumstances at home have small chance of thoroughly recovering lost ground. In many instances these patients go home, return to work, with inevitably the return of symptoms and another break in the cardiac compensation. We need convalescent homes where these patients may have careful supervision of their exercises, their diet and their amusements. When they leave the convalescent home there should be a proper placing of these handicapped patients in occupations, suitable to their physical tolerance, their temperaments and their abilities.

Liver Extract for Pernicious Anæmia.—Last year Drs. George R. Minot and William P. Murphy, of the Collis P. Huntington Memorial Hospital of Harvard University and the Peter Bent Brigham Hospital, reported the successful treatment of patients with a diet containing large amounts of liver. Over 50 patients have now been successfully treated for from 1 to 3 years with a diet containing approximately 200 grams of liver a day. Even though the individual with pernicious anæmia knows that he is the gainer thereby, a daily diet of liver in the quantities necessary to replenish the blood with red corpuscles is difficult to take for a long time. Consequently, a small dose of liver extract daily, that does as much good as 300 grams or more of the whole liver, represents a big advance in the treatment of this disease. The causes of this fairly common malady are unknown, though it is believed by some that a predisposition toward it is inheritable. This disease should not be confused with anæmia due to common causes. Dr. E. J. Cohn and his collaborators in the department of physical chemistry in the Harvard Medical School have isolated a non-protein-, non-fat-containing fraction of liver that promptly produces young red blood cells, and permits the total number of red blood cells to increase. Drs. Minot and Murphy are determining the effectiveness and the clinical uses of the successively purified extracts that are being prepared. Nine patients with pernicious anæmia have been fed the extract with entire success during the past months. The chemists are still uncertain as to the exact amount of the effective substance in the liver extract, since, despits the fact that the purification has proceeded far, a large part of the material in the present mixture may eventually prove to be inert. The development of the use of liver extract in the treatment of pernicious anæmia may be as important in its way as the outstanding achievement in the treatment of diabetes three years ago by the use of insulin.—*Science Supplement,* May 13, 1927.

CIRCULATORY FAILURE IN CHRONIC INTOXICATIONS AND VASCULAR DISTURBANCES: HYPERTHYROIDISM, CHRONIC ANÆMIA, CHRONIC NEPHRITIS, DIABETES, HYPERTENSION*

By J. C. Meakins, M.D., F.R.C.P. (Edin.)

Montreal

I SHOULD like to preface my remarks by a definition as to what in my conception, circulatory failure is.

Circulatory failure is the limit of the capacity of the circulatory system to propel a sufficient quantity of blood through the body to maintain the vital or, in a greater degree, the functional capacity of the different organs. This is a definition which rests upon a quantitative basis. An individual absolutely at rest both mentally and physically requires, naturally, a much less volume of circulating blood than does one either addressing the Medico-Chirurgical Society, or running a Marathon race. It reduces itself to a question in chronic disease of the work required versus the nourishment of the myocardium. Other factors, such as valvular lesions, are of secondary importance.

In Hyperthyroidism

Probably one of the most common, and at the same time serious, diseases confronting the surgeon and also the physician, is found in hyperthyroidism. I put this first because we have a combination of factors to deal with. In toxic adenoma there is a prolonged period of increased work night and day, sleeping and waking, and with it an associated and progressive hypertension; the progress of this hypertension merely representing an increased resistance to the myocardial function. Why it should develop is another question. But it seems in time to lead to myocardial degeneration and decline in efficiency. It is a common law in practically all organs, that if they work beyond their capacity, their capacity will steadily diminish. If, as may be done in this condition, the cause (toxic adenoma) be removed early enough, before permanent damage has occurred, the circulatory system will return to its normal condition.

It has been a custom, lately, to administer digitalis in cases of circulatory failure due to hyperthyroidism. This has become almost a passion. Many have a fanatical desire to produce "digitalization"—one of the words in the medical language abhorrent to my ears—which, if carried to its logical conclusion, far too often means the poisonous effect of digitalis on the myocardium. This is too frequently continued until it is recognized by the electrocardiograph. It is merely adding one toxin to another. If you look for the physiological action of digitalis on the myocardium, it is difficult for you to detect it in the regular rhythm in hyperthyroidism; but, it is after all a good deal better to err on the side of non-intoxication than it is to go beyond the realms of reason. The well-known toxic effect of digitalis is to reduce the diastolic relaxation of the heart and it may stop in complete systole. During the process there is a progressive decrease in the systolic output. This occurs especially easily in normal hearts in which there is no dilatation.

There seems to be a certain amount of experimental and also clinical evidence to indicate that in addition to the increased demand for circulation through increasing the metabolic rate there is in thyrotoxicosis an almost specific cardiac intoxication. Whether this is a direct effect on the myocardium, or through the sympathetic system is yet to be determined. It is not unusual to find in cases of myxœdema, and particularly in cretins in whom thyroid extract has been given for a long period of time, to maintain a reasonably normal metabolic rate, that the cardiac burden appears to be beyond what one would expect to maintain

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the blood supply for such a metabolic rate. The usual circulatory disturbances of exophthalmic goitre are very similar to those which occur in toxic adenoma, but in some cases, particularly in young people, the circulatory disturbance would seem to be out of all proportion to the degree of increased metabolic rate. Even with the exhibition of iodine and the reduction of the metabolic rate to 10 or 15 per cent above normal, still a tachycardia of serious character may persist. In my experience, on looking up the cases that have come under my control, this practically always occurs in young women between the ages of 14 and 24. An exact explanation I cannot give; but, in order to prevent the onset of circulatory failure, the time factor would appear to be as important as the elevation of metabolism and the sooner the cause is removed the better. It resolves itself into a recognition of cause and effect. The allowance of a case of hyperthyroidism to go on to a period when circulatory failure in its complete stage is imminent, is a gross negligence of the case. All the cardiac stimulants in the world are of no avail in such a condition. On the other hand, when patients come under observation with auricular fibrillation or auricular flutter already developed, the only procedure is the careful administration of digitalis to control the rate, the administration of iodine if indicated to control the increased heat production, and as soon as possible to remove the cause.

Many cases of hyperthyroidism present themselves to the physician, not on account of hyperthyroidism as an obvious condition but on account of circulatory failure, the fundamental cause of which has been overlooked either by the patient or by the attending physician. There is no essential difference in the treatment of auricular fibrillation *per se* whether it be due to hyperthyroidism or to any other of the usual causes.

In Myxœdema

In dealing with myxœdema, on the other hand, we have a rather intriguing subject. Myxœdema is sometimes associated with symptoms which are suggestive of angina pectoris. There may or may not be a hypertension, and one is on the horns of a dilemma. If thyroid extract be administered to correct the myxœdema there may be precipitated evidences of cardiac embarrassment, as indicated by præcordial pain and symptoms we consider to be diagnostic of angina pectoris. Apparently some insidious interference with the nutrition of the myocardium has taken place during the period of deficient metabolic function. As a consequence, when suddenly by the administration of thyroid extract there is produced an increase of the metabolic demands of the body, there is naturally an increase of the circulatory demand. A myocardium which has not had a chance to resuscitate itself during a long period of physiological starvation may be hard pressed in the altered circumstances. Therefore, in cases of myxœdema that may have no signs of præcordial distress, or even dyspnœa on exertion, it is well to administer thyroid extract in a cautious manner, to be conservative in altering the individual from his myxœdematous state.

In Anæmia

Another and very important disease producing circulatory failure is anæmia. This is purely myocardial starvation. Cardiac stimulants are of very secondary importance. For probably a long period of time the myocardium has been in a state of oxygen want due to a quantitative decrease of oxyhæmoglobin. During the period of rest and sleep the heart is probably the only organ of importance in physiological function that must keep functioning. The only logical way to treat circulatory failure in anæmia is to increase the amount of hæmoglobin. Anything else is unreasonable. This can be brought about either by removing the cause of the anæmia or by transfusion. But one must remember that transfusions are only a means to a temporary end if the main cause of the anæmia still exists.

Somewhat analagous to anæmia, is the circulatory failure of pneumonia where there is a combination of three factors. In the majority of cases there is an oxygen starvation, an increased resistance to the right heart, and added to both an indefinite and not easily assessed bacterial intoxication. There is only one of these that we can relieve. This is anoxæmia. If the patient is fortunate enough to be infected with type I pneumococcus, then the administration of the suitable serum may accomplish

much. The resistance to the pulmonary circulation is dependent upon the anatomical degree of the pathological lesion. I am convinced that in pneumonia there are two things which are essential for the maintenance of the circulation and these are the prevention of oxygen starvation and the maintenance of the carbohydrate and glycogen reserves by the intake of relatively large amounts of glucose. This is accomplished by the administration of copious quantities of fluid and carbohydrate, intravenously if necessary, early in the disease and not when the patient is *in extremis*.

In Nephritis

In chronic nephritis there are two factors which lead to circulatory failure. In the first instance there is chronic hypertension which for some reason or other develops in this disease. In fact, chronic hypertension may be the cause of the disease. If the nephritis is the primary cause, the natural procedure is to relieve so far as possible the interference with renal function. Or, in other words, to reduce the cause of the hypertension. There has been a great deal of discussion as to whether high protein diet decreases renal function. The evidence is still inconclusive. It would seem reasonable that if you can reduce the amount of nitrogen excretion you may reduce to some extent the burden placed on the renal function.

The other cause of circulatory failure is the occurrence of renal acidosis. It is usually a terminal condition and by the time it has occurred it is but a matter of a few weeks or a few months when the renal condition will be so far progressed that limitation of the acidosis is of but temporary benefit. The important thing to forestall circulatory failure in renal disease is to treat the renal lesion itself as early as possible. The other methods are purely secondary and in many ways incidental.

In Diabetes

On the other hand, in diabetes circulatory failure is not uncommon, although it was more frequent before insulin treatment. When semi-starvation was the usual form of treatment there was a pronounced depletion of glycogen in the myocardium as a result of the carbohydrate starvation. Furthermore, the myocardium is less capable of tolerating an accumulation of lactic acid than other muscles. This is not only true of lactic acid but also of other causes of an increase in hydrogen-ion concentration. In cases of diabetic acidosis that have been in coma probably for some hours, they may recover consciousness, but damage has already been done to the myocardium and they may subsequently die of circulatory failure, frequently due to the irreparable and irremediable lesion that has been inflicted during the hours of coma. Therefore, it is well to remember that in diabetic acidosis it is not only the coma that counts; but also the permanent effect which may be left on the myocardium.

In Hypertension

Now we come to a very much debated and more engrossingly important lesion which is purely a symptom, and must remain as such until we know the cause. Its name reflects our ignorance in the so-called "essential hypertension." During the development of this lesion there is a constant over-work on the part of the heart. As time goes on this over-work is reflected in the arteries as well. As a result, in addition to the hypertrophy of the ventricle, there is a hypertrophy of the musculature of the arteries. It turns them, as I often like to imagine them myself, into a vast system of pressure tubing with a small lumen and a hypertrophied wall. As a consequence a vicious circle is established; as the wall thickens and the lumen diminishes, the blood pressure and the work of the heart increases, and the reverse also occurs. It is relatively seldom that these individuals die of cerebral hæmorrhage, as a rule it is due to either clear-cut failure of the circulation, or to a primary contracted kidney in which the renal function fails before either the cerebral or the cardiac functions. The eventual lesion is one of total circulatory deficiency, whether it manifest itself chiefly by renal symptoms or chiefly by cardiac symptoms or chiefly by degeneration of the higher function of the brain. What determines the principal localization is unknown. For the treatment of this I offer you no solution. We are ignorant of its cause. There have been a number of theories put forward which are worthy of consideration; but, it is wiser for us to maintain an open mind and pursue the question of its elucidation, hoping to come to a true solution.

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In regard to circulatory failure, then in these chronic lesions, I think the key-stone of treatment is the recognition of the cause, prophylaxis if possible, of the continuation of the cause and, in the event that the cause may be removed, realize and visualize what that cause is and remove it at the earliest possible moment.

Discussion

Dr. Archibald: The subject of this symposium certainly deserves discussion, and it is equally certain that I am not competent to discuss its medical side. But what interested me particularly was Dr. Eberts' résumé of the principles underlying the occurrence of circulatory failure in shock and hæmorrhage. May I be permitted at this moment to congratulate Dr. Eberts on the scholarly and condensed, and the more scholarly because so condensed, presentation of these physiological principles. It is my own opinion that shock and hæmorrhage, which are frequently considered together, are two entirely different entities. We had a large experience in the War which, I think, forced us to that conclusion. We saw numerous injuries with severe hæmorrhage unaccompanied by shock, and numerous cases of profound shock unaccompanied by hæmorrhage. I, for my part, gradually came to be little afraid of pure hæmorrhage, and very much afraid of pure shock; that is, in severe grades. The effects of hæmorrhage were practically always relievable by sufficient restoration of the blood volume; not necessarily of the volume of blood, but of the volume of fluid in the vessels; because, in my opinion, the problem of hæmorrhage is very greatly a mechanical one. The nutrition of the heart can do with a very much reduced contribution of oxyhæmoglobin, (general nourishment), provided it has the volume upon which to work. The hæmatopoietic equipment of the body can restore the proper status of the blood if it has time, provided the heart and chief vessels are provided with a sufficient volume of fluid. Quite otherwise was it with shock. And I speak now of shock in its pure sense, without coincidence of any particular hæmorrhage. Shock produced, so far as I could judge from our observations, a condition of very much reduced volume of fluid in the circulatory system. Superficially one might consider it as a sort of hæmorrhage. It was, in a sense, an internal hæmorrhage, but it differed physiologically from hæmorrhage in the fact that the loss was one, not of whole blood, but of the plasma alone. Now, shock was characterized clinically by a blood pressure which was at least below 70, and very frequently was practically zero, and could not be obtained at all; by a very marked sub-normal temperature, often non-registrable with the clinical thermometer; by a condition of mental apathy which, however, never went on to unconsciousness; by a rapid pulse, and shallow breathing; but not, as in cases of pure hæmorrhage, by air-hunger and restlessness. The great problem was where had the volume of blood plasma gone to. One could put into the circulation a litre of saline but within one or two hours it had disappeared from the circulation. One could add to the saline gum arabic, or acacin, according to Bayliss's therapy, thus adding in a real way colloids to the fluid, and it disappeared from the circulation, much less rapidly than saline alone—in a number of cases taking perhaps 6 to 10, 12, or even 18 hours, as opposed to the 1, 2, or 3 hours of pure saline—but it still disappeared. Or one could transfuse whole blood, which was still better. And yet, if the shock were severe, in all these cases, the total amount of fluid in the circulation ultimately, after a number of hours, was again reduced to a very dangerous degree, and frequently in bad cases reduced to such a degree as to cause death. So far as I could determine that death was a death due to insufficient fluid in the circulation, rather than to any effect upon the myocardium, or any particular loss of nutrition of the myocardium. We had to deal with healthy hearts, and we all know that healthy hearts last a long time.

After coming home I carried out a series of experiments on a number of dogs and confirmed these observations. It has been recorded that the entire blood of one dog can be transfused by the direct method into another dog, the subject of severe shock; and that the blood of a second dog can be again transfused to the original shocked dog with temporary improvement, but again the appearance of shock and ultimate death. In other words, the blood plasma of two dogs had been lost somewhere in one dog. Here one reaches the region of hypotheses. We possess proof, however, that the loss of blood plasma is a loss out of the capillaries, due to some kind of capillary paralysis; whether of purely nervous origin as a reflex, based upon extreme sensory or emotional stimulation, or of toxic origin, due to the absorption and local action of some histamin-like substance delivered, let us say, from crushed or burned tissue, (as Lewis and Grant recently have proved to be the case in histamin shock and anaphylactic shock), it is difficult to say. There is certainly, according to the authors just mentioned, an increased permeability of the capillary endothelium. But while this may explain the escape of plasma, it leaves us still in the dark as to the fate or mode of destruction of that plasma. It is not collected in tissue spaces, because in cases of shock one finds no œdema with pitting. My own hypothesis is that it is taken up integrally by the cells themselves, perhaps mostly in the liver cells. The process is a "flitting", a "moving house", an unfortunate "trek" with disastrous results. If we are to save the patient with bad shock, whether due to industrial accidents, severe burns, or even such things as acute pancreatic necrosis, we must realize this fact, or what I assume to be a fact, that blood plasma is lost into cells to which it contributes nothing; that the chief danger of death arises from loss of fluid in the circulatory system; and consequently that we have somehow to devise means by which fluid can be kept in the capillaries. For it is a capillary affair undoubtedly, not venous. Splanchnic engorgement is a myth. If you can provide that enough blood shall get through the capillary bed, the systemic and splanchnic veins will pass it on. How best to accomplish this object we do not yet know; but, apart from the obvious duty of eliminating the cause of the shock in the measure of the possible, it would seem that our best chance lies in whole blood transfusions.

Dr. Campbell Howard: It has been a pleasure to listen to the various papers in this symposium. I unfortunately did not hear that of Dr. Campbell, so I cannot discuss it. I was much interested in Dr. Ebert's presentation of surgical shock and was pleased to hear Dr. Archibald's remarks concerning it. Dr. Moffatt's paper was essentially "practical" and I would emphasize the need of "lightening the load" as being one of the most important factors in the treatment of cardiac failure. If one saw a driver urging a cart horse to climb up a steep hill, with his whip, we should probably have him arrested or urge him to lighten the load which the beast was trying to drag up the hill. Should we not first lighten the heart's load by a timely venesection, before applying the physiological whip, namely digitalis? I believe many lives would so be saved, even in pneumonia, where the right heart bears the brunt of the fight. Dr. Meakins' able presentation of myocardial failure in such conditions as hyperthyroidism and hypertension needs no word of explanation from me. He is a master of this particular subject and has put very clearly before us to-night the various indications for the

management of each group. I was particularly interested in his reference to myocardial failure in goitre and myxœdema, because it is only recently that a recognition of myocardial failure in myxœdema has made its appearance in medical literature.

I think, Mr. President, the only criticism I have to make is that no physiologist or pharmacologist was here to-night to present their points of view before the meeting. I feel certain that every practitioner present has thoroughly enjoyed the papers and will go home the wiser for having heard this excellent symposium.

Dr. Lafleur: If it is in order to ask one who is not a stated member of the symposium to explain some points in his remarks, I should like to ask Dr. Archibald if at the autopsies, which he presumably made upon the dogs on which he carried out his experiments, whether there was any evidence of an increased plasma in the cells. For example, was the liver of the dog enlarged? Was it heavier than one would expect in a dog of that age which had not been subjected to shock? That, it seems to me, would tend to prove his hypothesis; if he could state that in the organs, and particularly in the liver, there was an actual measured increase of fluid.

Dr. Archibald: Dr. Lafleur's question is a very natural one. I asked myself that question, but only after the close of the series of experiments. I have to depend for the moment upon my memory of the protocol notes and of the appearance of the organs during the experiments. I may say this, however. First of all there was no histological examination of the liver, or of other tissues, and certainly there was no very noticeable increase in the size of the liver, nor appearance of splanchnic engorgement such as has been ordinarily described. On the other hand I argued that if blood plasma had gone out of the vessels and could not be demonstrated in the interstitial tissues as œdema, the natural conclusion was that it had gone into the cell bodies of the various tissues, not merely in the liver alone, but possibly also the muscles and other organs. Such cellular swelling from plasma absorption would not necessarily be evident macroscopically or perhaps even microscopically. One can think that a large amount of fluid might be absorbed by the tissue cells without showing evidence of such absorption macroscopically or microscopically. One might expect, however, some increase in weight. This was not ascertained. It is only in the cells it could disappear.

Dr. Eberts: I think perhaps that in shock, surgical shock due to injury without loss of blood, the effect upon the capillaries is primarily due to cerebral cell exhaustion, and cerebral exhaustion plays a very important part in the terminal result. Lewis is now so much impressed with the rôle of the capillary, that he is giving his attention entirely to the capillary end of the circulation rather than to the heart itself. I was very much interested in what Dr. Meakins had to say with regard to auricular fibrillation in thyroid conditions, in toxic adenoma and exophthalmic goitre. We have had a large number of these cases. The toxic adenomata furnish the great majority which, although relieved of their toxicity, still continue indefinitely to fibrillate. In exophthalmic goitre the fibrillating heart usually returns to a normal rhythm after thyroidectomy. It is a question whether fibrillation in the adenomatous type is induced wholly by the thyrotoxicosis. It is an extraordinary fact that in exophthalmic goitre the heart rate in young subjects may be accelerated to two or three times the normal rate for a prolonged period without permanent damage. Such a heart rate, if due to a bacterial toxin, would be looked upon as a portent of ultimate or immediate cardiac failure.

I may say in regard to the use of digitalis that we have no doubt as to its efficacy, but I think there is a great deal in what Dr. Meakins says, that it is very easy to give these patients too much digitalis, that they may come to operation in a state of intoxication, not only as a result of hyperthyroidism, but as a result of over-dosage of this drug.

Dr. Meakins: Just one point that I am afraid I didn't make clear; but I think Dr. Eberts has done so. In the circulatory failure of toxic adenoma I quite agree with him that the long insidious intoxication that goes on for years, is the reason why we have permanent effects in the myocardium as distinct from the exophthalmic type which are usually more fulminating and in which the time factor is not so important.

Thyroid Extract and Cataracts of the Eye.—The much-discussed thyroid gland has a new use. Drs. William J. Kerr, George N. Hosford and H. C. Shepherdson, of the University of California, have found that several of their cases of cataracts in elderly people have improved vision after the administration of thyroid extract. Senile cataracts are thought to occur in individuals in whom a general break-down of the body forces is under way and consequently any agent, such as thyroid substance, that tones up the whole system, is likely to be helpful in improving the impaired vision. The doctors are careful to state that cataracts may remain stationary for years and even clear up upon occasion without treatment, thereby making it difficult to prove the actual value of any curative procedure that may be undertaken. They have, however, obtained such good results from this method that it may develop into a new weapon of attack against this insidious form of blindness. The general condition of the patient should be carefully studied, says Dr. Kerr, and it is well for the practitioner or internist to co-operate with the ophthalmologist while the extract is being given. "There is no great danger in the administration of thyroid substance, if the patients are carefully studied before treatment and watched for toxic symptoms. When the metabolism of cholesterol is better understood we may find a relationship between it and formation of cataract in the senile as well as the diabetic patient. Further studies are needed on the metabolism of sodium, potassium, magnesium and calcium in relation to the changes in the lens in senile cataract."—*Science Supplement,* May 13, 1927.

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An Address

ON

THE RELATION OF THE BASIC MEDICAL SCIENCES TO SURGERY*

By William J. Mayo, F.A.C.S.

Rochester, Minn.

THE establishment of the Donald Church Balfour Foundation Lectureship in Surgery is evidence of the sincere desire of a distinguished alumnus of the University of Toronto to express in concrete form gratitude for the education which has enabled him to follow his life work.

It is especially fitting that the time chosen for the initial lecture on this foundation should be the hundredth anniversary of the birth of one of the world's greatest benefactors, Joseph Lister, and that annually in the years to come the Balfour lectures on surgery will be given at this time.

The Foundations of Medicine

If we turn back to the scant historical records of ancient Egyptian civilizations, Egyptian from the geographic rather than from the racial standpoint, because men of many races from the Near East groped for knowledge in Egypt, we find that in 10,000 years there were no less than eight complete relapses into barbarism. As one after another of these ancient civilizations have been uncovered from the sands of time, much of interest to early medicine has been revealed, but little of distinct value applicable to present-day methods employed in medicine.

In the days of the ancients the dangers man could see with the unaided eye were those of large dimensions, wild animals, serpents, and tempests, relief from which lay in physical action. The dangers which were not visible were considered visitations of unfriendly spirits, and from them the people prayed to their gods for relief. Occultism, the mother of cults, was rampant. Belief in fairies, ghosts, spirits, gods, and devils was the forerunner of belief in the reincarnation of the dead, and communication with the departed, exemplified in the modern spiritualistic seances. The various cults come and go as the frauds of the old are discovered and replaced by the frauds of the new, always with appeal to the emotions and prejudices of the unenlightened.

The early history of scientific medicine was greatly influenced by Greece, because Greece contained maritime ports which enabled all the evidences of early civilizations to be brought to her doors. Is it any wonder that Aristotle, the Greek, (B.C. 384-322) the first of the great physicians, the tutor and medical advisor of Alexander the Great, (B.C. 356-323) should be looked on as the originator, one might say, of medical science? On the death of Alexander his empire of the then known world resolved into various fragments, and Egypt and the Near East, which had given through the Phœnicians the alphabet and through the Babylonians the sidereal year, under the Ptolemies collected from the known civilizations a great library and museum in the city named for Alexander on the Mediterranean delta of the Nile.

We think of the Ptolemies, who ruled Egypt for 300 years, chiefly for the last of their ill-fated line, Cleopatra, whom Shakespeare immortalized in his drama, "Anthony and Cleopatra," but let us not forget their great service to science. It was in Alexandria that the students of Aristotle in the Ptolemaic school of learning gave to the world *scientific methods* based on original investigations, the gathering of facts at first hand and relating them with natural phenomena. Is it remarkable that this beginning of scientific methods from which true

* The initial lecture on the Donald Church Balfour Lectureship in Surgery, the University of Toronto. Toronto, Ont., April 5, 1927.

knowledge sprang should have controlled scientific thought for 2,000 years?

The Sixteenth Century was pregnant with new developments. It was the age not only of Elizabeth (1533-1603) and Shakespeare (1564-1616) but also of Francis Bacon (1561-1626), who gave to the world inductive logic which, paralleling deductive logic, introduced experimentation and developed scientific imagination, the building of images to be compared with facts that were known.

It was in this period that the second great figure in medicine lived and worked, William Harvey (1578-1675), the father of physiology. We think of Harvey as the discoverer of the circulation of the blood, but his work went away beyond the discovery of isolated facts. He was an anatomist as well as a physiologist. He recognized that one purpose of the pericardium was to protect the heart from bursting during violent physical strain; recognized that the peculiar twisting motion of the heart was to enable its cavities to empty themselves of the blood they contained, as a wet cloth is freed from water by wringing. All of the scientific undertakings of Harvey were characterized by the same logical association of facts that he manifested in his observation of the circulatory system.

It should not be forgotten that contemporaries of Harvey were John Mayow, the first of the physician-chemists, whose work led to the discovery of oxygen, and Sydenham, the master clinician.

From this fertile age came the first crude form of the microscope, introduced by the Janssen brothers in 1590, the most significant scientific contribution of all time, and destined to change the history of mankind. The mind of man was built up coincidentally with the eye, and it is this fact, not the mechanics of the eye, that has made intellectual progress possible. In the lower vertebrates an expanded olfactory ganglion was the forerunner of the cerebrum, and the sense of smell not only controlled their behaviour, but remains in the lower animals the only special sense which is not relayed through intermediate ganglia. The great expansion of the cerebrum in man, however, completely overthrew the dominance of the olfactory sense, giving control to vision, and established direct relationship with consciousness, thereby governing behaviour.

Nevertheless, the sense of smell, by reason of its direct connection with the cerebrum, remains, even in man, the most delicate of all the special senses, being able to detect with marvelous accuracy colloidal and molecular substances suspended in the air as gases and vapours beyond the possibility of detection by artificial means. The senses of hearing, taste, and touch are secondary in that they reach consciousness indirectly, and only when trained by the eye do they reach perfection.

From the time of Harvey it was nearly 200 years to that of John Hunter (1728-1793), the third outstanding figure in medicine, who became not only an anatomist and a physiologist, but also a pathologist, and, for the first time in the world's history, correlated and related the isolated facts of scientific medicine into a coherent whole. The Hunterian Museum of the Royal College of Surgeons of London, with its thousands of specimens prepared and labelled in black by John Hunter's own hand testifies to the industry and the scientific imagination of this man to whom was given the power of seeing man as a physiologic unit.

We must not pass by with too scant mention of William Hunter, the elder brother of John Hunter. In the next 200 years many of his almost forgotten contributions to physiology proved to have been made with the vision of the prophet. While the great chyle vessels were known, it was William and John Hunter who first described the lymphatic system and traced its minute subdivisions. The Hunters in their dissections had the incomparable advantage of a crude form of microscope and the hand magnifying glass which enabled them to follow the course of injections of dyes into vascular and lymph channels. Belchier, of Guy's Hospital, in 1764 had introduced madder dye for this purpose.

One hundred years later were born two men whose work stamped out the plagues of infections and communicable diseases and added 13 years to the average lifetime of man. These two men, Pasteur (1822-1895) and Lister (1827-1912), whose birth we celebrate to-day, may well be considered together. With the advantage of improved microscopes and the development of staining and cultural methods Pasteur, of

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France, proved his theory of the origin of disease in microörganisms and changed the whole aspect of medicine. Lister, of England, related microörganisms to infections and putrefactive processes and developed methods of prevention which were to be the greatest gift made by man to surgery. Owing to the discoveries of Lister, hospitals for the first time became safe. Previously suppuration and gangrenes had caused so ghastly a mortality that patients were safer operated on in the forest than in the hospital.

As one considers the pioneers in medicine one recognizes in Aristotle the development of knowledge through scientific methods; in Harvey the foundation of physiology and anatomy; in Hunter the correlation of the basic sciences in relation to medicine; in Pasteur the determination of microörganisms as the cause of disease; in Lister the sound application of the new knowledge to the cure and prevention of diseases of man.

These heroic men whose life work marked epochs in medicine we think of as individuals, but what they accomplished singly was perhaps of less importance than the inspiration they gave to the group of men who followed them.

Physiology and Anatomy

Life is a struggle for food, and changes in the habits and in the form of all animals are adaptations for the purpose of obtaining food. It has been well said that anatomy has been studied from the dawn of history, not for love of science, but because of fear of death, in an endeavour engendered by fear to understand the causes of death that they might be obviated.

Charles Darwin (1808-1892), in that remarkable series of deductions to be found in his *Origin of Species*, laid the foundation for the practical study of evolution through investigations of embryology and comparative anatomy.

The basis for science in medicine fundamentally is anatomy. Physiologic requirement is the architect, but anatomy is the master builder, and the evolution of physiology must be studied in anatomy, embryology, and comparative anatomy. This is well shown in the Ptolemaic school, in which anatomy of all living things was first related to the study of medicine. Harvey was a student of Fabricius at Padua, and his love for anatomical dissection is apparent in his accurate descriptions of anatomy. John Hunter, the Scotsman, was an anatomist primarily, and to his genius we owe the general conception of the cure or alleviation of pathologic conditions in man by careful surgical dissections.

Anatomy has been the foundation of surgery, and in no place has the tradition of the anatomical basis of surgery been more carefully followed than in Scotland, where to-day, as in the past, are made the finest surgical dissections.

Up to the time of William Sharpey, an English anatomist (1802-1880), anatomy and physiology were taught together. Elliot Smith well says that it was a misfortune that the students of this splendid anatomist separated physiology from gross anatomy and carried microscopic morphology into the teaching of physiology. Merely the fact that the anatomical picture was microscopic did not justify separation of cause and effect.

Early in the Nineteenth Century we find evidence of greater interest in histology, especially in Germany. Schneiden and Schwam in 1838 first described the cell, which Virchow (1821-1902) said was the unit of life. And to Virchow and his school through the cell theory we owe a newer and better understanding of anatomy and physiology, although Virchow developed his theory from that perverted physiology which he called cellular pathology. The greater part of this new knowledge came from the study of material obtained at necropsy. However, while dead-house pathology gave an enormous amount of knowledge, it did not lead to rapid improvement in therapeusis. The physical changes resulting from terminal causes such as infections so often obscured the early disease manifestations that post mortem study gave little understanding of the disease in its curable stages. These early pathologic changes Sir Berkeley Moynihan has well described as "the pathology of the living." Interpretation of the pathology of the living is the outstanding feature of modern medicine.

Biochemistry

The mind of man is a visual mind. The outstanding fact in the history of medicine is that the visual method of obtaining information has been dominant. To make visible the unseen in physics and chemistry is the task of scientific medicine. Bayliss says that there is no

dividing line between physics and chemistry; that only under certain physical conditions can there take place the atomic interchange in the molecule called chemistry. The unit of life is no longer the cell, but the ultramicroscopic entities called colloids, lying between the microscopic limit of 1/10 micron or 1/250,000 inch in diameter and 1/1,000 micron or 1/25,000,000 inch in diameter. We must not forget that anatomy as truly concerns the invisible colloidal, molecular, and atomic structures of the body as the visible gross structures, and that these minute constituent particles are controlled by the same physiological laws. Our knowledge of these ultramicroscopic structures dates back to the early period of the Nineteenth Century and is due largely to three men. Brown (1773-1858), the English botanist, in 1827 pointed out that when a pencil of light was thrown into a dark room there would be seen in rapid oscillation certain motes of light of which there was no other physical evidence, and that this phenomenon could also be seen with the microscope in certain fluids. The dancing motions of these light motes were called the Brownian movements. Dalton (1766-1844), working at the same period with so little scientific apparatus as to be one of the wonders of the scientific world, propounded his atomic theory, and in connection with his work the vibratory movements of the particles first observed by Brown were given the name of "the dance of the molecules."

It was not until 1861, however, that the real significance of these motes of light was elucidated by Thomas Graham (1805-1869), Master of the Mint in London. Graham conceived the idea that these light motes were reflections of minute bodies which, while invisible, were larger than a ray of light, and so acted as mirrors to reflect the light. The rays of light travel 186,000 miles a second, but when refracted or reflected by an object the wavelengths speed is changed and the rays become manifest as colours in the lines of the spectrum. The longest ray appears to the retina as red, and in order of the length and speed of the rays, orange, yellow, green, blue, and violet are seen. On the relative length of these rays is based the colorimetric system which to-day plays a most important part in the newer medicine. The ultraviolet ray, which is too rapid to be detected by the eye, stimulates physiologic activity, whereas those vibratory rays which are longer and slower than the red give rise to heat.

Graham further observed that these minute bodies which reflected light would not pass through parchment paper, nor form clear solutions. Because these bodies in the mass felt sticky, owing to their enormous surface tension, they were given the name of "colloids," a Greek term meaning glue. Graham also noted that certain other substances, such as the crystalloids for instance, sugar and salt, which would pass through parchment, formed clear solutions. The crystalloids, representing the molecular constituents, were smaller than the ray of light, and therefore did not refract light. These experiments in a general way gave the early boundaries of the molecular field.

Scientific application of these methods, using the x-ray, which is only 1/100,000,000 inch in vibratory length, permitted the examination of the atom itself and led to the discovery of the electron and the proton. The proton is the positive nucleus of the atom around which the electron revolves in rapid motion. It was Moseley, that brilliant young Englishman who lost his life in the Gallipoli campaign at the early age of 28, who saw the significance of these facts and who showed that there was 92 possible elements between hydrogen, the lightest, and uranium, the heaviest, and that between each two elements in the progression of atomic weight there was approximately the weight of one or more atoms of hydrogen. Wherever there was a gap a new element would be discovered; all but two of the elements are now known.

Anatomy and physiology have thus been traced to the electron and the proton. The actual exchange of electrons and protons in the atom alters the constitution of the molecule, and upon this alteration life depends.

Oxidation

Heat and energy to drive the human machine depend on oxidation, the union of oxygen with other elements. The hydrogen activation theory of Wieland is perhaps the best explanation of the process of oxidation. The great source of energy for the human body is carbon, in which the heat of the sun is stored through the agency of the mechanism furnished by chlorophyl, the

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green colouring matter of plants. When the carbon is oxidized, the carbon dioxide (CO_2) which represents the ash, is eliminated by the lungs.

The power of the sun which is used in breaking up molecular compounds containing hydrogen remains latent in the hydrogen atom, and when this power is released by oxidation, which rebuilds the hydrogen molecule, heat and energy are available for vital needs. The ashes of this action, if one may so speak, are represented by water (H_2O).

Foods are classified in three groups: carbohydrates, fats, and proteins, and all contain carbon, hydrogen, and oxygen. The higher the oxygen content, the more rapid the oxidation. The fats (glycerin stearate, $C_{57}H_{110}O_6$), have a higher oxidizable molecular content, and therefore more heat and energy, than carbohydrates, represented by glucose (glucose $C_6H_{12}O_6$), but burn more slowly because of a relatively lower oxygen content. In addition to the carbon, hydrogen, and oxygen, the proteins contain nitrogen, which gives form to the tissues by permitting the deposition of other elements, such as calcium and phosphates, and a little sulphur. The nitrogen is not combustible and when it has served its purpose it is thrown out of the body as urea, an ash, which if present in excess in the blood has grave consequences.

Kendall has shown that an atom of sulphur in the catalyst acts as a thermostat which holds the heat of the body at 37° C. A pound of sugar burned outside the body will produce the same amount of heat as a pound of sugar burned inside the body, but only at a temperature above 400° C.

Metabolism

The essential alkalinity of the bodily tissues is slight. This alkalinity has been compared to the difference between tap water and distilled water, and at that, distilled water must be fresh or it would absorb sufficient acid from the carbon dioxide in the atmosphere to upset the alkali-acid balance. An excess of alkali in the blood, called alkalosis, is now known to have as serious effect as diminution of alkali, badly named acidosis, because an acid reaction in the blood is incompatible with life.

Among the constituents necessary to life are salt and iodine. These two elements are a heritage from the water vertebrates. Iodine, like salt, is soluble and easily washed out of the soil, and is closely concerned with vital metabolic changes. The discovery of thyroxin by Kendall gave not only insight into but a tremendous impetus to the successful management of goitre.

Seventy-five per cent of the body weight is due to water. There is as much water in the muscles as there is in the blood, but in a different colloidal combination. Carbohydrates, fats, and proteins in a molecular form are carried in the bloodstream. The arterial blood contains 18.5 per cent by volume of oxygen. Krogh and Haldane have shown that in man at rest, each cavity of the heart expels about 4 liters of blood a minute. During violent exertion, to supply the necessary amount of oxygen to the tissues, the entire volume of blood passes through the heart and around the body every ten seconds, and the amount expelled by the heart each minute is increased from 4 to 24 liters.

Krogh showed also that during the systole of the heart there is sufficient dilatation of the arterial capillaries to open tiny ostia which permit the escape into the tissues of molecular food products with the oxygen. The extraction of the heat and energy is the function of the tissue colloids and the negative pressure in the veins draws the carbon dioxid into the venous channels for elimination through the lungs. In shock, sufficient dilatation of these ostia permits the blood colloids to pass out into the tissues.

"Rehabilitation"

Examinations of the secretions upon which sole reliance formerly was placed are now aided by examinations of the blood. The estimation of the blood sugar helps us to understand not only diabetes but also the relation of shock to subnormal blood sugar content. Suitable preoperative treatment of the patient suffering from diabetes with that splendid product of Canadian genius, insulin, has brought the operative mortality in these cases down to little more than the mortality in cases of patients without diabetes. The estimation of the blood urea is no longer guess work, but an accurate estimation of renal function and is a guide to elimination of toxic substances. Creatinin estimations have

their prognostic value. Through determinations of the blood chlorides and the carbon dioxide we get a clue to baffling conditions which formerly led to death.

All of these estimations either directly or indirectly concern vision. The discovery of the aniline dyes by Perkin (1838-1907) led to a great advance in medicine. Rowntree and Geraghty made a splendid contribution to accuracy in medicine by finding that the molecule of the dye, phenolsulphonephthalein, is the same size as that of urea and that it is eliminated through the kidneys in the same way. Visual methods of detection and measurement are now available. By further experimentation Rowntree found that the dye, phenoltetrachlorphthalein, when injected into the bloodstream is eliminated entirely through the bile. Later Rosenthal from this fact developed a valuable method of the estimation of hepatic function. Graham and Cole have utilized Rowntree's discovery to develop cholecystography, working first with phenoltetrachlorphthalein, which in the gall bladder gave a faint shadow under the x-ray, later with the corresponding iodine and finally with a bromine substitution product of phenoltetrachlorphthalein.

Photography has enabled the eye to examine at leisure the phenomenon of motion in the ultramicroscopic field. One twelve-millionth of a second is sufficient to make a photograph which will show a bullet in flight at a muzzle velocity of 3,000 feet a second as though it were standing still.

All these are examples of our ability to analyze the individual in his vital processes as we would analyze in the test tube. The past generation solved the problem of communicable and infectious diseases, largely those of the first half of life. The present generations are solving the problem of the premature deaths of middle and later life caused by diseases of the heart, the lungs, kidneys, and nervous system; even cancer, the age-long enemy of man, is on its way to defeat.

The new surgery concerns the rehabilitation of the patient so that surgical operations not only can be performed more safely, but also, by proper preparation, many patients heretofore considered beyond help can be brought into condition for life-saving operations.

The future of medicine depends on further study of biologic phenomena, which, after all, concern the fundamental sciences of physiology and anatomy.

New Thoughts on Bacterial Variants.—For many years medical students have been taught that bacteria could be identified by fixed morphologic and serologic standards. In the past, a specimen that did not conform to standards was in danger of being considered a degeneration or an involution form, and therefore of little importance. The specimens observed were commonly discarded and the blame for such abnormal progeny placed on poor mediums or old age of the culture. However, from the first, many investigators have believed in the changeability of bacteria and have urged that differentiation on the strength of morphologic and biochemical characters alone was not justified. "Scattered data" have accumulated gradually regarding the significance of culture changes and the instability of species of bacteria. Now a review of this material by Hadley (Microbic Dissociation, *J. Infect. Dis.*, Jan., 1927, xl, 1) indicates that cocci become rods and rods cocci or spirals, spore formers become sporeless, hæmolytic activity comes and goes, virulent cultures become harmless and harmless cultures virulent, and antigenic power vanishes and reappears, but that these changes are not chaos; they represent a physiologic reaction to an underlying biologic principle common to all germ life. Hadley believes that bacterial instability is the manifestation of processes related to the reproductive mechanism of bacteria, the importance of which investigators are just beginning to understand. Eventually, he says, bacteriologists will realize that the free-living micro-organism is potentially a kaleidoscopic thing in which the power of responding successfully to a changing environment by altering itself, and even by self-destruction, in order to generate a more stable type, is its one most important attribute. Will the bacteriophage, the dissociative phenomena on and in culture mediums, the variation in types of such organisms as diphtheria bacilli, *Bacillus coli*, the pneumococci and others be found to have something in common which will explain the problems that have retarded bacteriology? The question will be answered by the research of the future.—Editor *J. Am. M. Ass.*, May 14, 1927.

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Une Conférence
SUR
Lister

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QUAND le monde médicale universel s'unit a cette heure pour honorer la mémoire d'une de ses plus nobles figures, *Lister*, il convient que la Faculté de Médecine de l'Université de Montréal s'associe a cet hommage mondial: et rendant hommage a l'une des gloires médicales, elle s'honore elle-même ce faisant.

Des milliers de disciples d'Esculape qui ont pratiqué l'art de guérir, combien ont atteint à une réputation nationale?—combien en est-il qui ont joui d'une célébrité mondiale a leur époque? Bien plus—combien en est-il de ces noms qui, a travers les ages, sont arrivés jusqu'a nous? Peu-bien peu a la vérite. Et de cette élite-étoiles de première grandeur—qui sont-ils ceux dont les activités scientiques—les œuvres médicales sont connues de nous aujourd'hui? Si peu a la vérité que le mot du dramaturge-philosophe nous vient à l'esprit: what's in a name:—qu'y a-t-il dans un nom!

Pour le certain il n'est pas de nation qui n'ait raison d'etre fière de quelques grands noms. Les Grecs ont eu Hippocrate et Aristote comme les Romains Galien et Celse. L'Italie de la Renaissance avec ses grandes universités de Bologne—Verone—Padoue et Pise se glorifie de Morgagni-Columbus et Fabricius d'Aquapendente. Les Flandres produisirent Vésale comme la Hollande Boerhaave. Et plus près de nous l'Autriche fut fière de Rokitansky, prédécesseur de Virchow que l'Allemagne vénere comme le créateur de la pathologie cellulaire.

Mais l'Angleterre et la France aussi ont, tout le long des temps modernes, donné naissance à des gloires médicales de tout premier ordre. La première ne donna-t-elle pas le jour à Harvey et Sydenham, aux Hunter et à Jenner, le précurseur de la Thérapeutique Préventive? Tandisque la France se glorifie à bon droit de tels noms que ceux de Descartes, grand physiologiste; de Mareschal qui libéra les chirurgiens de la gente autocratique médicale; de Bichat et Dupuytren, précurseurs de Rokitansky et Virchow; de Louis, le grand clinicien qui voyait accourir le monde médical autour de sa chaire vers les 1840, comme le signale *Osler*.

Mais à la vérité tous ces médecins fameux n'atteignirent qu'à une gloire de leur temps-même fut elle mondiale et la répercussion de leurs travaux sur les générations qui suivirent ne fut que de quelque durée. Ils ne firent pas *Œuvre Humanitaire*. De ces réels *Bienfaiteurs de L'Humanite* il n'en est vraiment peut-etre que *Cinq* que nous puissions signaler:

Paré—Parce qu'il mit fin aux tortures des amputés, dont on cautérisait les moignons au fer rouge puis les arrosait d'huile bouillante—en les remplaçant par la Ligature des Vaisseaux.

Pinel— Encore — et pourquoi? Parcequ'au temps de la Révolution il fit cesser les traitements inhumains infligés aux fous, que l'on tenait misérablement enchainés comme des bêtes fauves.

Que dire des bienfaits accordés a l'humanité souffrante toute entiere par la Merveilleuse *Découverte de l'Ether* comme anesthesique par *Morton* à l'aurore du XIX siècle. Les curieux étaient groupés autour du chirurgien Warren: c'était au Massachusett General Hospital, lorsque Morton lui dit tout modestement: your patient is ready, Sir. Et les incrédules virent cette chose inouie d'un opéré reposant sans agitation, inconscient à la douleur sous le couteau du chirurgien.

Arretons-nous un instant en contemplant ce spectacle qui se passe modestement dans le silence d'un hôpital—et pensons au bien-fait immense pour nos malades de cette découverte qui change les horreurs de la salle d'operation en les douceurs du sommeil bienfaisant.

Et venant vers notre époque apparait sur le recul de l'histoire la grande et sympathique

figure de *Pasteur* à qui nous devons la découverte des premiers agents causes des maladies infectieuses et contagieuses. Non seulement découvre-t-il le premier les causes des fléaux dévastateurs mais le premier aussi il en trouve la cure et l'agent protecteur. Que de milliers de malades lui ont dû la guerison: leurs légions aujourd'hui en moins d'un siècle sont devenus millions. Et le merveilleux savant, le grand sauveur, écrivait au déclin de sa vie: "Oh l'immense bonheur de penser que vous avez contribué quelque chose au progrès et au bien de l'humanité". Voila le cri des âmes fortes!

Mais les horreurs des salles d'hôpital continuaient—les opérées mourraient drus comme mouches sous la pourriture dite d'hôpital et les suppurations prolongées. "Les salles de la plupart des hôpitaux en Angleterre à cette époque sentaient la pourriture" à écrit Sir St. Clair Thompson. Et il en était de même par tout le monde à cette époque.

Jusqu'an jour où un éclair de génie fit germer au cerveau de *Lister* la possibilité de sauver les malheureux qui encombraient les hôpitaux. Vous connaissez les bases de l'œuvre de *Lister*: l'adaptation à la pratique de la chirurgie des idées et des principes promulgés par *Pasteur*. *Lister* en eut le *Genie*.

Mais qu'est-ce donc que le *Genie?* Nul exemple mieux que *Lister* n'en qeut fixer la définition-si ce n'est celui de son grand ami et collaborateur: *Pasteur*.

En effet on a défini *Le Genie:—Une Longue Patience*. *Lister* le prouva, à la suite de *Pasteur*, qui écrivant à son pere le remerciait de lui avoir "montré ce que peut faire la patience dans las longs efforts".

Les idées de *Pasteur* ont éveillé à leur tour des idées nouvelles chez *Lister;* des principles du premier le Maitre anglais, méditatif et réfléchi toujours, tira des conclusions pratique. Il recherche, expérimente, étudie et reprend sans cesse les expériences. La lueur apparait, l-expérience vient apporter la moisson des faits probants, la clarté se fait, et un jour à la suite de longs et patients efforts *La Methode Est Crée.*

La clarté: mais qui la voit? Il est entourré d'aveugles: personne ne veut même regarder.

Et alors commence pour *Lister* le long Calvaire de la lutte contre l'ignorance-contre l'obscurantisme, contre l'entêtement, voire meme contre l'apathie. Il s'agit d'allégir des souffrances-de sauver des vies: rien ne fait. *Lister* semble prêcher dans le desert. Mais pendant ce temps, le jeune chirurgien, conscient de la vérité découverte, organise son service, rescape les opérés, sauve des vies. A Edimbourg où il pratique au Royal Infirmary, nous avons trouvé la tradition de son souvenir.

Rien ne saurait arrêter le vaillant travailleur. C'est qu'une flamme vit en lui et lui fait vainere tous les obstacles: son Idéal: *Servir!* Oui, servir l'humanité. Comme *Pasteur* il veut "contribuer quelquechose au bien de l'humanité", les étudiants affluent, les étrangers accourent auprès de lui pour voir les merveilles: *Un Art Nouveau Est Né!*

Et voilà que tout à coup il laisse son poste glorieux d'Edimbourg, l'atmosphere sympathique qui l'a finalement soutenu, et il part pour un poste de professeur de clinique chirurgicale en un modeste hôpital de Londres au King's Hospital. Est-ce la Gloire qu'il poursuit? Certes non! il n'a qu'en faire. Ses étudiants a Edinbourg sont au nombre de 300 a 400 et ils augmentent. De tous les coins de l'Europe les étrangers, oui les étrangers, affluent chex lui. C'est que le *Devoir* l'appelle—the *Call to Duty*. C'est qu'il croit à une *Mission à Remplir*. Un impérieux sentiment le pousse à vouloir convaincre le monde du bien de sa cause-de la supériorité de sa méthode antiseptique. D'un grand centre comme Londre-où tout l'Empire Britannique converge-voire même presque le monde-la lumière diffusera plus facilement, croit-il, et partant la vérité.

Combien froid fut l'accueuil-combien grande l'indifférence des amis-combien envieuse et hautaine l'opposition. Quand même il résiste-il lutte. Que de jours sombres! Mais l'âme est d'acier-et le courage bien trempé. "L'expérience fut humiliante"—dira-t-il plus tard. C'est à de telles épreuves que se reconnaissent les âmes supérieures. N'en fut-il pas ainsi pour tous les novateurs?: Ambroise Paré—Servet—Harvey —et Pasteur donc! Quelle opposition tenace n'apportèrent pas l'obscurantisme et la routine à ces apotres des idées nouvelles.

La Gloire vint enfin-après tant de luttes opiniatres: mais ce fut l'étranger qui l'apporta. Il semble que Matthew Arnold eut raison lorsqu'il écrivait que l'ambiance anglaise était imperméable aux Idées. Mais n'en avait-il pas

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été de même en milieu francais lors des idées novatrices et subversives de Pasteur? Tant il est vrai que l'esprit humain est routinier et qu'il abhorre voir ses idoles ébranlées et terrassées!

En 1877—l'année de l'arrivée de Lister a Londres—à ce Londres qui refusait de le reconnaitre mais qu'il venait convertir—tout le monde médical étranger allait l'acclamer à Amsterdam au Congres International de Médecine. Et quatre ans plus tard—en 1881—c'est a Londres—a Londres hésitant encore—qu'il triumphait, lorsque les chirurgiens due monde venaient lui faire ovation, pendant qu'il se trouvait encore de ses propres compatriotes pour se refuser à la lumière. Qui ne sait que l'on est rarement prophete en son pays.

Las de tant d'opposition chez lui-il trahit un jour son âme à l'un de ses asistants en lui disant: "Si la profession s'attarde à ne pas reconnaitre ces principes, le public l'apprendra et alors la Loi interviendra pour imposer la Vérite." Et il ajoutait: "Mais je ne verrai pas ce grand jour." Une Providence bienveillante veillait sur le Grand Apotre et avant que la limite d'age vient le forcer à déposer la serpe de la moisson glorieuse et quitter sa clinique—la lumière enfin faisait tomber les dernières écailles des yeux de tous et *l'Antiseptie Triomphait!*

Lister fut un esprit de forte trempe: il est de la grande élite. C'est que sa formation reposait sur des bases solides. Toujours il fut un amateur des classiques; les grands esprits de tous les temps étaient ses compagnons de prédilection. *La Bible* d'abord, puis Horace, Dante, Shakespear, et Goethe étaient ses préférés. N'est-ce pas le commerce des grandes intelligences—des Litterae Humaniores—qui faconne l'esprit et trempe l'âme pour les grandes épreuves? Il élargit les horizons, donne à l'esprit cette ampleur et cette profondeur qui la préparent à résoudre les grands problems, la façonnent aux méthodes logiques et tout en l'adoucissant lui donne cette trempe qui lui procure cette." Æquanimitas Animæ dont parle si bien *Osler* et lui sert de refuge et de soutien aux heures d'adversité.

Mais ceci n'eut pas été suffisant pour sa gloire: et Lister fut davantage. N'est-il pas en effet le type parfait—a l'instar de Pasteur—du *Research Student—de l'Explorateur.* Et l'inquisiteur, l'homme de recherche—est un individu fort complex à la vérité.

Si la *Curiosite Scientifique* est son mobile toujours-il doit aussi posséder à fond son sujet et celui des Sciences alliées. Ne doit-il pas etre aussi un Technicien Habile—et à la dextérité des mains allier la *Logique* de *l'Esprit*—la puissance d'analyse puis de synthese qu'il aura acquis par sa formation première, de grundlage des Allemands. Et dominant le tout, la Persévérance et le Courage pour le triomphe de ses idées et la résistance à l'adversite. Le Génie est une longue patience disions-nous: tel fut *Lister.*

Mais *Lister* fut mieux encore—et plus grand—parcequ'il fut d'Ame Noble. Que de beaux traits ses intimes ne nous ont ils pas rapportés de lui-ceux qu'il pénétrerent son intimité—les Rickman Godlee, les St. Clair Thompson, les Stewart d'Halifax. Jamais exista plus modeste serviteur de la Vérité et de la Science—ni plus doux et compatissant chirurgien aux souffrances humaines. N'avait-il pas dit un jour à ses élèves de Glasgow:

"Deux grandes choses sont requises pour faire un bon médecin: D'abord: un coeur sympathique. Puis la passion pour la recherche de la Vérité." Et l'on comprend ainsi facilement l'empire de ce géant compatissant, tant sur ses éleves que sur ses malades. Il suffisait de l'approcher pour le vénérer et l'estimer.

Lister est allé à sa Récompense: la *Gloire* ici—et mieux La Haut:—pour les souffrances innombrables qu'il a épargnées aux malheureux des hôpitaux—pour les vies qu'il a sauvées, lui par milliers—et qu'il nous permet a nous ses disciples d'aujourd'hui de sauver de par le monde, par millions,—mais peut etre encore mieux pour son noble exemple de courage et de persévérance-pour so Foi en un Idéal de Bienfaisance-pour sa Bonté compatissante aux miseres de ceux qui souffrent. Quel spectacle inoubliable ce fut lors du Jubilé de Pasteur à la Sorbonne de Paris en 1892—alors que le monde médical venait apporter au savant francais l'hommage de son admiration universelle—le Grand Vieillard anglais d'un geste spontané s'avanca lui donner l'accolade fraternelle qui nuit dans une étreinte sympathique deux nobles coeurs, deux grands esprits.

Esto vir!—Lister et Pasteur le furent.

Et je termine ce modeste hommage à cette homme *Admirable en Tout* que fut Lister par ces paroles du Maitre Anglais à ses élèves: "Si nous n'avions nous médecins que l'anticipation d'un bénéfice pécunier ou d'honneur mondain peu désirable serait notre profession. Mais sachons que sa pratique comporte de bien rares privilèges. C'est notre honneur de traiter ce tabernacle de l'âme immortelle qu'est le corps humain—et nos pas, si nous poursuivons notre route dignement-nous conduiront par la Verité et la Bonté à l'Honneur. C'est à l'accomplissement de cette noble tache que mes voeux vous invitent et vous accompagnement, mes amis."

An Address

ON

ASTHMA: ITS DIAGNOSIS AND TREATMENT*

By H. K. Detweiler

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Part I

IT is difficult to obtain reliable statistics concerning the prevalence of asthma, mainly because it rarely, if ever, is the direct cause of death. Every physician, however, meets with its manifestations so frequently in the course of his practice, that it behooves us to review the situation periodically in order to keep abreast of modern methods in diagnosis and treatment. This is particularly true in view of the great amount of new work which has been done in connection with this condition during recent years. If anyone should wish to have evidence of the interest now being taken in this subject by the medical profession, he need only glance through the list of titles of papers on asthma and allied conditions during the past two or three years. This very mass of literature makes such a survey as I propose to present the more necessary in order to obtain a proper perspective.

No doubt it would help to clarify the situation, and enable us better to understand each other, if we were able to agree upon a classification of this disease. For our present purposes, at any rate, it will probably be sufficient to utilize the following simple etiological classification, one which I have used with satisfaction for some years:

1. Protein asthma. 2. Bronchitic asthma* 3. Cardiac asthma.*

Protein Asthma

In 1906 Wolff-Eisner[1] suggested the anaphylactic nature of the condition known clinically as hay fever. The relation of certain proteins, particularly those of pollens, to this disease seemed fairly obvious, and the method of demonstrating the sensitivity of the patient was so simple that it was not long before the theory was accepted generally. In 1910 Meltzer[2] suggested that asthma might also be a phenomenon of anaphylaxis. He based his theory upon certain facts elicited in the study of anaphylaxis by Auer and Lewis working in his laboratory at the Rockefeller Institute. These facts may be enumerated briefly as follows:

(a) In an anaphylactic attack the bronchi are constricted.

(b) The constriction is of peripheral and not of central origin.

(c) Atropine relieves the anaphylactic attack.

He argued that these conditions undoubtedly obtain in asthma. He pointed out that they obviously were present in the asthma associated with hay fever, and it was his belief that they would hold for other forms of the affection.

Meltzer's theory was put to an exhaustive

* From the Department of Medicine, University of Toronto. Read before the Kingston and Frontenac Medical Society, Feb. 14, 1927.

* To be published in our next issue.

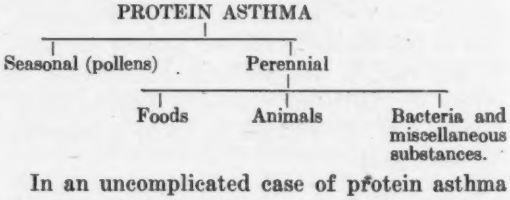
clinical test during the next few years, and while it has not been proved to hold in all cases of asthma, it has been amply substantiated in a large group of cases. Indeed it has served sharply to divide all cases into two great subdivisions: (1) those which are sensitive to protein; and (2) those which are not. The former are now regarded by careful observers as comprising the whole group of primary asthmatics, while the latter, or non-sensitive cases comprise a mixed group, composed chiefly of cases of asthma in which the primary factor is an infection. In other words it is found to be a fact that in all cases in which asthma is the *primary* condition, a protein sensitization can be shown to exist; whereas, conversely, in those cases in which no sensitization can be demonstrated, it can be shown that the asthma is a manifestation *secondary* to upper respiratory tract infection, bronchitis, or cardiac disease. Of course it is true that cases of the first group (protein asthma) may in time come to be indistinguishable from the second group because of the inevitable secondary changes which eventually appear in the bronchi and lungs as a result of the prolonged series of asthmatic attacks. This point will be brought out more fully later in this paper.

To understand what is known regarding this type, it is necessary to go back a little farther than the work of Meltzer and his co-workers, and trace briefly the history of our knowledge of the phenomenon called "anaphylaxis".

As a result of observations by Magendie in 1839,[3] followed by Richet in 1902[4] and Theobald Smith in 1903,[5] it was established as a fact that the first dose of a foreign protein given to an animal is followed after a suitable interval (10 to 12 days) by a condition of markedly greater susceptibility to that protein. This hypersusceptibility was called anaphylaxis by Richet, and really constituted a condition exactly the reverse of immunity. A dose of protein, even a small dose, administered during this period of hyper-susceptibility, will bring on a train of symptoms depending for their severity upon the size of the dose and the degree of anaphylaxis in the animal. Anaphylactic shock, with death, frequently results. If less severe, the symptoms are very like an attack of asthma. The antigen (the protein employed) on being first injected, stimulates the animal to produce a specific antibody for that protein. The second dose of antigen meeting the antibody in the animal, results in a reaction giving rise to toxic products which cause the characteristic symptoms. These are the phenomena which suggested to Meltzer a relationship between anaphylaxis and asthma. It would be useless to follow at this time the steps in the investigation which resulted from these suggestions, but we may state that in protein asthma we now know that the patient is previously sensitized to some protein, but we do not know why, or when, this sensitization occurred. We do know that the *tendency to become sensitive* is inherited, but the individual concerned must be exposed to the particular protein before he becomes sensitive to it.

Various observers have disagreed regarding the hypothesis that the clinical conditions of asthma and hay fever are truly anaphylactic in nature. Some immunologists, such as Coca, contend that because no antibody can be demonstrated in the blood of such patients, the condition is not analogous to anaphylaxis in experimental animals, and Coca[6] has suggested the term "atopy" to cover this clinical condition. Kolmer[7] has recently reviewed the situation and after stating the arguments for and against the anaphylactic theory, states that he is satisfied that there is sufficient evidence of the presence of a specific antibody to warrant the definite opinion that asthma and hay fever are true anaphylactic phenomena. It is not within the province of this paper to enter into a detailed discussion regarding the arguments put forward in connection with this controversy, but I think it will serve our immediate purpose to indicate, as I have done, the present situation with regard to this question.

Protein asthma may be subdivided into two main types on a basis of seasonal and non-seasonal incidence; the following table adapted from Walker[8] will illustrate this:



In an uncomplicated case of protein asthma the clinical picture of a severe attack would be as follows:

Upon exposure to the protein to which the patient is sensitive, there is usually a feeling of tightness in the chest, which rapidly grows more and more intense until the breathing becomes little more than a succession of quick gasps, followed by prolonged and wheezy expirations. The main difficulty seems to be in expiring the air, with the result that although all the muscles of respiration are brought into play, the expiratory act is so prolonged that the impulse to inspire comes before the chest has emptied itself. Thus each succeeding respiratory cycle leaves the chest with an additional amount of residual air. The net effect is that it is not long before the lungs are greatly distended, the diaphragm is low, the superficial cardiac dullness obliterated, and the whole chest is being held in an extreme inspiratory position. Fortunately, just as it would seem that the patient must suffocate, there comes a tendency to cough and a thick, tenacious, jelly-like material is brought up in increasing quantities. With the advent of this sputum, or probably just preceding it, the bronchial spasm begins to lessen and in a comparatively short time the attack has subsided. The whole cycle may last from half an hour to three or four hours, and there may be a succession of attacks with little respite in the intervals. Between the attacks, physical examination of the chest reveals no abnormality whatsoever, but during the attack, in addition to the signs already enumerated, there are to be noted hyper-resonance, prolonged expiratory murmur and numerous dry râles, mostly of high and medium pitch.

If at the height of an attack the patient is given a hypodermic injection of a few minims of adrenalin chloride, 1-1,000, relief is experienced in a few moments. Atropine has a similar effect, but the action is less rapid. It is generally assumed that the adrenalin acts upon the sympathetic nerve-endings causing a relaxation of the spasm of the bronchial musculature, and this relaxation has the effect of restoring the lumen of the bronchus concerned to its normal size. This view is supported by the findings in sensitized animals who have been given a second dose of protein with the production of anaphylactic shock. If the animals are allowed to die in anaphylaxis, post mortem examination reveals a marked spasm of the bronchial muscles. If, on the other hand, the dose of protein is not too large, and adrenalin is administered, the anaphylactic condition is relieved and the respiratory embarrassment of the animal ceases in a manner similar to that of the human asthmatic.

Many observers believe, however, that the respiratory difficulty in human cases of asthma is not due to bronchial muscular spasm, but rather to the turgescence of the mucous membrane of the bronchial tree as a local effect of the protein to which the patient is sensitive. This turgescence of the mucous membrane is claimed to be not unlike the local reaction of the skin upon the application of such protein to abraded areas. The proponents of this theory claim that the action of adrenalin in these cases is similar to its action in uticaria; that is, it acts upon the smooth muscle of the smaller blood vessels and on the contractile cells of the capillaries.

Diagnosis

It is well here to emphasize the importance of a careful history. According to Walker "four-fifths of the cases beginning their asthma in infancy are sensitive. Two-thirds of those beginning in childhood are sensitive, while only one-half of those beginning in young adult life, and one-third in full adult life give a positive test. When the asthma begins after the age of forty-five, practically none are sensitive." From this it is clearly evident that the history of onset aids materially in the diagnosis.

We have found that an accurate account of the first attacks, particularly with regard to whether asthma or bronchitis appeared primarily, is also of great value, especially in the patients with an onset after twenty years of age. In those with earlier onset, it is doubtful if the best clinical history can render unnecessary the carrying out of the protein tests to be described.

The physical examination of cases of uncomplicated protein asthma shows the chest held in the inspiratory position with diminishing excursion, deeper resonance, prolonged expiratory murmur and numerous dry râles. The breath sounds are frequently difficult to hear, partly by reason of the adventitious sounds which usually are very prominent, and partly by reason of the lessened air entry. Often this

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suppression of the breath sounds is heard more particularly over certain areas, suggesting, therefore, that the bronchial spasm or turgescence may be irregularly distributed, or that it has actually plugged the bronchus supplying the area referred to. Between attacks, in the uncomplicated cases, there is no abnormality to be found on physical examination of the chest. On the other hand, if the patient has been a sufferer from asthma for a considerable time, chronic pulmonary emphysema supervenes, accompanied by secondary bronchitis. In such cases, examination between attacks reveals the characteristic physical signs of this condition. At this stage the protein asthmatic resembles the patient with bronchitic asthma, and a differentiation becomes impossible from physical examination alone.

In the uncomplicated protein asthma cases the sputum is usually clear and jelly-like, and is only present during an attack, or for a few hours after. It therefore differs in its character from the sputum in the cases of bronchitic asthma, in which there is usually a yellowish or greenish type of sputum; in other words the sputum is of a purulent character from a pyogenic infection.

Finally, cases of protein asthma will show in nearly every instance a response to one or more of the cutaneous protein tests. A brief description of the technique of these tests follows: A sufficient number of small abrasions are made upon the ventral surface of the forearm to accommodate the various proteins to be used. These scratches may be made with a sharp scalpel and should be about one inch apart, an eighth of an inch long, and need not be deep enough to draw blood. A drop of $\frac{N}{15}$ NaOH is placed upon each abrasion, and a minute amount of the protein powder rubbed into it. The first scratch nearest the bend of the elbow is left without protein, to serve as a control, because it is occasionally found that the mechanical scratching of a sensitive skin will cause a small wheal to form. The proteins must be kept in solution by replenishing the soda solution as it evaporates, and one-half hour should elapse before the test is complete, and the proteins are removed.

In the average case of true protein asthma, it will be noticed within a few minutes that a red areola is appearing about one or more of the abrasions to which offending proteins have been applied. In the centre of this areola, about the scratch, a wheal will be observed, which gradually increases in size until its maximum is reached within thirty minutes. The smallest wheal which is considered positive, and therefore of diagnostic importance, is 0.5 cm. in diameter. Usually it is larger. A definite wheal less than 0.5 cm. in diameter, in the absence of any reaction at the site of the control abrasion, may be considered as suspicious, and worthy of further consideration.

In certain clinics the proteins are injected in solution form into the skin, instead of being placed upon a superficial abrasion. The idea of this is to secure the maximum reaction possible in the belief that certain weak reactions will not appear with the cutaneous method and will be found positive by the intracutaneous method. There has been a good deal of controversy over the two types of technique in the past few years, but the majority of investigators favour the scratch method because of the lessened liability to non-specific reaction. In other words, the intracutaneous test is in some instances too delicate, and in those cases where the skin is very sensitive, false reactions are frequently encountered. It is obvious that dependence upon the readings where false reactions are present will result in errors in etiological diagnosis, and therefore in treatment.

About 50 per cent of patients show a positive reaction to more than one protein. According to Walker this so-called "multiple sensitization" is most frequent among cases whose asthma began early in life. It has been my experience that the most common type of multiple sensitization is that in which a patient sensitive to, let us say, horse dander, will show a definite, though lesser sensitivity to other animal emanations such as dog hair or chicken feathers. In other words, the multiplicity of sensitizations in these cases is confined to more or less related proteins, and is an example of the "group reaction" familiar to bacteriologists. Nevertheless, one does see cases in which widely differing proteins are concerned, as a cereal protein and an animal protein at the same time. The probable explanation of this phenomenon is that the fundamental factor is a peculiarity of the

patient's cells which renders them *liable to become sensitive*. This is believed to be hereditary. Just what the patient eventually becomes sensitive to, depends upon what protein or proteins he is exposed to in overwhelming doses. Heredity plays no part in this phase of the process, but a lowered general state of health, such as is present during an acute infectious disease, pregnancy, etc., probably is a contributing factor.

The proportion of all cases of asthma which prove to be sensitive, in any given series, depends upon several factors. Most important of these is the age of onset, so that if the series includes only children the proportion will be high. In general practice it is probably about 30 per cent. The largest series of cases reported in which all classes of patients are represented is that of Walker, who analyzes his records of 600 asthmatics. He found that 48 per cent gave a positive skin test, and approximately half of these showed a multiple sensitization. The largest group of all sensitive cases in his series was made up of those who were sensitive to animals. Of these by far the largest number were due to horse dander. Next to this group were those who were sensitive to food protein (24 per cent of all sensitive cases). Cereals caused the highest number in this group. Pollens caused asthma in 22 per cent of all sensitive cases, the most frequent pollen being that of ragweed. Bacterial proteins were positive in 20 per cent of the sensitive cases. It is important to differentiate *sensitivity* from *infection* in bacterial cases, as the latter is the cause of all asthmatic bronchitis, whereas the former proved to be only a subordinate cause of true bronchial asthma. Walker[9] has given up the use of bacterial proteins in routine testing since he regards bacteria as the cause of all asthma not produced by the proteins of foods, animals, pollens and certain miscellaneous proteins, and the treatment is the same (vaccine) whether the bacteria produce asthma by sensitization or infection.

The routine series of proteins for cutaneous testing should include the following representatives: *Pollens*: June grass, redtop, timothy, orchard grass, ragweed, goldenrod and daisy; *miscellaneous substances:* orris root and house dust; *animal emanations*: horse dander, cat hair, cattle hair, dog hair, sheep wool, rabbit hair, chicken, goose and duck feathers. Of the foods the following should be represented *cereals*: wheat, oats, corn, rice and rye; *meats*: beef, pork, lamb and chicken; *fish*: salmon, mackerel, lake trout and white fish; *vegetables*: potato, cabbage, spinach, cauliflower, onion, turnip, parsnip, lettuce and celery; *fruits*: orange, tomato, apple, peach, prune and pineapple; *miscellaneous foods*: milk and eggs.

Of the cases of seasonal asthma the large majority react to one or more pollens, and their symptoms of asthma are usually associated with those of hay fever. Of the non-seasonal cases of asthma the animal emanations appear to be the most frequent cause in adults, whereas foods, particularly eggs and milk, are the most frequent offenders in children. It seems rather remarkable in connection with asthma due to animal emanations that the anaphylactic nature of this condition was not suspected earlier, since observers have for a long period of time connected the presence of certain animals and the symptoms of asthma in a definite way. The writers of older systems of medicine such as Goodhart and Spriggs in Allbutt and Rolleston give instances of horse and cat asthma, but apparently did not realize the full significance of the association and it remained for Meltzer to call attention to this. In this connection it is interesting to note that feather asthma has been known for centuries. The following quotation from Kern illustrates this[10]:

> In 1552 Jerome Cardan, an Italian, and the most celebrated physician in Europe of his day, was called to Scotland to attend John Hamilton, Archbishop of St. Andrews. For nearly ten years the Archbishop had suffered from asthma that had baffled the leading physicians of Great Britain and France, and that had greatly restricted his activities and even threatened his life. When Cardan reached Edinburgh, it was decided to try for 30 days the treatment prescribed by other consultants, but the patient got no better. Then Cardan instituted his own measures, and with remarkable results. He gave a host of directions as to his Lordship's diet and activities, and prescribed various drugs, but it is of particular interest to note that he directed that the "Reverend Lord should not sleep upon feathers but upon unspun silk, and be particular upon that point. The heating of the spine and vena cava on a feather bed would cause matter straightway to ascend into the head. The pillow should be of dry straw finely chopped, and if that seemed to his Grace too hard, it might be stuffed with well-dried seaweed but by no means with feathers."

It is recorded that the Archbishop rapidly improved and we know that he was able to take an active part in Scotch politics until he was hanged fully 15 years later.

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In connection with dust it is important to realize that it may act in two ways. First, by mere mechanical irritation: most asthmatics volunteer the information that inhalation of dust of any kind is apt to make them worse. On the other hand there are those who react to the protein contained in house dust extract. It is sometimes remarkable to note the specificity in these cases; certain individuals will react to the dust of a certain house and not to that of any other. In my experience, however, the majority of dust sensitive cases will have an attack wherever house dust is plentiful. The following case illustrates this type:

C. A. S., a commercial traveller, aged 42, consulted me in January, 1925, because of asthma to which he was subject throughout the year. He was unable to offer any clue as to the causation. The test with stock house dust extract yielded a violent reaction. After discussing this feature of his case with him I was able to elicit the following interesting history: He frequently had attacks of asthma during the week days while on the road, but was always free, or nearly free from attacks while at home over the week-end. He always had severe attacks on visiting his mother. The explanation of this fact was that his wife was a very scrupulous house-keeper, so much so that he confessed he felt that she was a slave to her housekeeping. His mother was getting on in years and no longer supervised the keeping of her house, and the servants allowed a great deal of dust to accumulate.

There are occasional cases in which the patient exhibits asthmatic attacks upon the ingestion of certain drugs. The commonest of these drugs are aspirin and quinine. Sometimes very severe reactions occur when these drugs are taken, and it is usually unwise to disregard a patient's statement that he thinks asthma is brought on by the taking of any given drug. I have seen several aspirin cases which had had severe attacks of asthma, but these passed off without serious results. However cases are on record, such as Kern's patient who mentioned to her former physician that she was not able to take quinine. Curiosity, however, led him to give her a mixture containing 1/8 of a grain of quinine to the dram. Within a few minutes after the first dose the patient almost died of angioneurotic œdema with œdema of the glottis.

The points brought out in the diagnosis and differential diagnosis of protein asthma may be summed up in the following table:

TABLE OF DIFFERENTIATION

	Protein Asthma
History.—	Usually early onset. No bronchitis until later in the disease. Clear jelly-like sputum.
Clinical exam.—	Expiratory difficulty. Chest clear between attacks.
Laboratory tests.—	Protein tests positive.
	Bronchitic Asthma
History.—	Usually late onset. Asthma follows on a history of bronchitis. Usually muco-purulent sputum.
Clinical exam.—	Inspiratory difficulty. Signs of bronchitis between attacks of asthma.
Laboratory tests.—	All protein tests negative.

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The Dick Reaction at Different Ages.—S. Heller (*Med. Klinik*, March 4th, 1927, p. 320) has studied the Dick reactions in 1,112 patients of various ages; the result of the test was positive in 47.6 per cent. He considers the variations at different age periods important. In twenty newly born babies the result was negative in all, although two of the mothers showed positive reactions. Schultz and Charlton found that the subcutaneous injection of 0.5 to 1 c.cm. serum from a convalescent caused fading of the rash at the site; this has been confirmed by many observers, and this property of the convalescent serum is regarded as specific. Heller has observed the same process after injection of serum from an infant, showing that its immunity is specific and confirming the observations of Hainiss. The greatest sensitiveness is found between the ages of 2 and 5 years; after prophylactic injection 75.5 per cent of such children were negative. The author thinks that younger children are more difficult to immunize, partly because of their higher sensitiveness to the disease and partly owing to the greater difficulty they have in forming antitoxins.—*Brit. M. J.*, April 23, 1927.

An Address

ON

THE VALUE OF ULTRA-VIOLET RAY THERAPY IN CHILDHOOD*

By Frederick F. Tisdall, M.D. (Tor.)

Toronto

IT would be indeed most difficult to choose a more controversial question at this time than "the value of ultra-violet therapy in childhood." Although the use of ultra-violet rays from an artificial source dates back to the work of Finsen in 1893 it is only during the past three or four years that the medical profession at large has taken an active interest in the possibilities of this form of therapy in the treatment and prevention of disease. Its use has increased by leaps and bounds, stimulated naturally by the manufacturers of the various ultra-violet lamps, until to-day many members of the profession are using ultra-violet therapy with complete lack of discrimination in regard to the choice of the disease treated. Therefore it is now an opportune time for the Academy to take stock of the results obtained with this form of therapy, in an attempt to determine as far as possible those conditions in which its use is justified.

Before proceeding further, we must first consider what we mean by heat, light, and ultra-violet rays. These rays are still generally regarded as a form of ether-wave energy, the character of which is dependant on the length of the wave. The unit of measurements is a millimicron which is one-millionth of a millimeter in length. The visible rays in "sunlight" range from 760 millimicrons which are perceived as red light down to 380 millimicrons, which are perceived as violet light. The invisible rays are composed of the ones longer than 760 millimicrons which are heat rays, and the ones shorter than 380 millimicrons which are ultra-violet rays. The rays from a mercury vapour quartz lamp differ considerably from sunlight as the shortest invisible rays in sunlight are 290 millimicrons in length while the rays from a quartz lamp extend down to 185 millimicrons. Thus the radiations from a quartz lamp have a much greater ultra-violet content than sunlight.

I wish to emphasize, however, that the results obtained by sun treatment or heliotherapy are frequently different and frequently more beneficial than those obtained with ultra-violet rays from an artificial source.

Finsen obtained his spectacular results in the treatment of skin tuberculosis by the use of a water cooled carbon arc lamp. The lamp most frequently used in this country is of the air cooled mercury vapour quartz type and my discussion in the present paper is confined to the results obtained with this type of lamp. The rays are generated by an electric current passing through mercury vapour in a quartz receptacle. Quartz is used because glass will not transmit rays shorter than 320 millimicrons. The amount of radiation depends on the amount of current passing through the lamp, and also on the age of the quartz cell. This makes the question of exact dosage a most difficult one.

Studies on the biological effects of ultra-violet rays are most interesting. It was first shown by Downes and Blunt in 1877 that sunlight produced a definite bactericidal action. Later in 1890 it was demonstrated by Koch that tubercle bacilli were rapidly killed on exposure to direct sunlight. Since then it has been found that the lethal effect on bacteria is due largely to the ultra-violet rays and the shorter the wave length the greater is this lethal effect. In regard to the blood practically all investigators agree that a lymphocytosis is stimulated by ultra-violet radiation. The blood platelets according to Cramer and Drew are increased after exposure to ultra-violet rays. These investigators consider that blood platelets are part of the defensive mechanism against infection by bacteria. Other experiments undertaken in England in which

* Read at the Stated Meeting of the Academy of Medicine, Toronto, March 1, 1927.

the blood was removed from adults before and after exposure to ultra-violet rays showed a marked increase in the bactericidal power of the blood after the individual had been exposed. These investigations would indicate that ultra-violet rays can increase the resistance of patients against infection. It has been established beyond doubt both here and elsewhere that an increase in the calcium and inorganic phosphate content of the blood occurs after the exposure of the patient. These and other experiments indicate that ultra-violet rays may have a profound effect on the whole metabolism of the body.

A glance through some of the recent articles and books on ultra-violet therapy is sufficient to convince almost any reader that he is doing his patients a very grave injustice if he does not immediately install a mercury quartz lamp for the treatment of all and sundry conditions. I will not weary you by going over these articles but will simply quote a few passages from the most recent book in our Academy Library on this subject—(Ultra-violet Radiation and Actinotherapy by E. H. and W. K. Russell, 1926, with a foreword by Sir Oliver Lodge.)

"The chief general effect is an increase in the rate of metabolism, the appetite is stimulated, and the whole resistance of the body is raised; hence the value of this treatment after acute illnesses, and in weakly children and adults. The number of micro-organisms in the intestinal tract is reduced, absorption is facilitated, and catarrh is lessened. The tone of unstriped muscle is increased, and obstinate cases of constipation and auto-intoxication from the bowel are greatly benefited. Anæmias are aided by stimulation of the hæmopoietic system, and by an increase in hæmoglobin; rickets from the increase of calcium and phosphorus in the blood; and surgical tuberculosis and many infections by the increase of the bactericidal power of the blood, lymphocytosis, and increase of general resistance. Lorand considers ultra-violet radiation valuable for its rejuvenating properties, the reason for these being, in his opinion, due to stimulation of the endocrine glands, especially the thyroid and sexual glands." . . . . "Good results have been claimed in the following diseases by various observers."

After which follows a list of 137 diseases which vary from gout to hæmorrhoids, and infantile paralysis to barber's itch.

During the past month I had the opportunity of visiting a number of the pædiatric clinics in the United States. At each clinic an expression of opinion was obtained as to the value of ultra-violet therapy in the treatment of various conditions.

At the Children's Hospital in Boston, Professor K. D. Blackfan found ultra-violet therapy of unquestionable value in the treatment of three conditions: (1) rickets, (2) tetany, and (3) tuberculosis, particularly of the abdominal, mediastinal and glandular types. He considered it of questionable value in the treatment of bone and joint tuberculosis. Benefit was also obtained in non-tubercular enlargement of the mediastinal and cervical glands. Patients with psoriasis improved while they received treatment. Favourable results were obtained with furunculosis, but in most cases the improvement was no more marked than when ordinary treatment was used. Questionable results were secured with malnourished infants and children. Negative results were obtained with eczema.

Professor Edwards A. Park of Yale also found ultra-violet therapy of unquestionable value in the three before-mentioned conditions: rickets, tetany and tuberculosis. He also considered it of value in the so-called simple anæmias of infants and in most cases of purpura provided it was given in maximal doses.

Dr. Alfred F. Hess of New York found ultra-violet therapy an absolute specific in the treatment of rickets and tetany and of unquestionable value in tuberculosis. He was particularly impressed with the favourable results in abdominal tuberculosis. In regard to the pulmonary form, considerable caution should be used with this treatment. As to its general tonic effect, he found with some children the general condition was improved, the appetite stimulated and the vigour increased; while in many others he failed to obtain any of the desired effects. In regard to increasing the resistance against infections such as the "common cold", Dr. Hess supervised a carefully planned experiment for three months with 50 children, as a result of which it was concluded that irradiation from a mercury vapour quartz lamp did not decrease the incidence of infection. No increase was found in the hæmoglobin. With furunculosis results of value were obtained while with eczema the results were unsatisfactory.

At the Nursery and Child's Hospital in New York, the quartz lamp was found to be of value in the treatment of rickets, tetany and tuberculosis. Particularly favourable results were obtained with glandular tuberculosis. No definite results were obtained in the treatment of malnutrition.

Dr. Charles Gilmore Kerley of New York was impressed with the value of ultra-violet therapy in the treatment of cervical adenitis of non-tubercular origin. He also found it of value in the treatment of chronic bronchitis with enlargement of the mediastinal glands. Some benefit was obtained with furunculosis. The results with eczema were of doubtful value. As at the other clinics, specific results were obtained with rickets, and tetany.

At the Harriet Lane Home, Johns Hopkins Hospital, Baltimore, beneficial results were obtained with mediastinal and glandular tuberculosis. The rays were also of value in bone tuberculosis. Good results were secured with furunculosis. With malnourished infants doubtful results were obtained. With erysipelas and eczema ultra-violet therapy was found to be useless. As elsewhere specific results were obtained with rickets and tetany.

At the Hospital for Sick Children, Toronto, Professor Alan Brown, physician-in-chief, obtained practically no beneficial results from the ultra-violet treatment of furunculosis. With certain types of chronic eczema it was found to be of some value but with acute eczema it was found to be useless. Doubtful results were obtained with malnourished children. Ultra-violet therapy appeared helpful in the treatment of the unusual condition "cœliac disease." Dr. H. A. Dixon, in charge of the skin clinic, found it a useful adjunct in the treatment of three conditions only, namely: psoriasis, seborrhœic dermatitis, and alopecia areata. Dr. R. I. Harris of the Surgical Service who obtained such brilliant results in the treatment of bone tuberculosis with heliotherapy obtained distinctly inferior results with exposure to the quartz lamp. At present the observations in regard to the treatment of other tubercular conditions have not been completed. As at all other clinics, specific results were obtained in the treatment of rickets and tetany.

Sooy and Moise of Yale recently reported the cure of patients suffering from thrombo-cytopenic purpura by means of radiation with the quartz lamp. In this condition the platelets are markedly reduced. We obtained negative results with two patients and Dr. Blackfan of Boston had a similar experience. Also at Yale, they recently had one or two cases in which the response was not marked, so we must consider ultra-violet therapy of questionable value in the treatment of this unusual condition.

From a survey of the results at the various pædiatric clinics throughout the country, it is evident that the beneficial effects obtained with the ultra-violet treatment of rickets and tetany are singularly constant. Suitably prepared cod liver oil is of definite value in the treatment and prevention of these diseases and from the practical standpoint can be used as a routine measure but the results obtained are not quite so certain or quite so marked as those obtained with ultra-violet therapy. It is probable that in the annals of medicine there is no other instance of a specific form of therapy, drug or otherwise, which so constantly produces the desired effect. In regard to tuberculosis, all observers are unanimous in their opinion as to the beneficial results from irradiation by the mercury vapour quartz lamp. The most favourable results are obtained with the abdominal, mediastinal and glandular forms of the disease while doubtful results are obtained with bone and joint tuberculosis. In the treatment of pulmonary tuberculosis, extreme caution should be used as ultra-violet therapy tends to cause an engorgement of the internal organs with the resultant danger of hæmorrhage. In most of the other conditions in which beneficial effects are produced ultra-violet therapy must be regarded only as a useful adjunct which can generally be replaced by more simple forms of treatment.

One word of warning as to dosage. There is little doubt that harm may be caused by too vigorous treatment. It is to be remembered that ultra-violet rays have a lethal effect not only on bacteria but on living cells. It has also been shown that an overdose of ultra-violet rays reduces the blood platelets and the bactericidal power of the blood. The fact that at present the dosage used is entirely empirical and the degree of effect varies with each individual patient, combined with the difficulty of accurately measuring the dosage, renders this aspect of the problem a most difficult one.

Conclusions

Ultra-violet therapy by means of the ordinary air cooled mercury vapour quartz lamp is an absolute specific in the treatment of rickets and tetany. Definitely beneficial results are obtained in the treatment of abdominal, mediastinal and

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glandular tuberculosis. The results are questionable with bone, joint and pulmonary tuberculosis. Chronic non-tubercular cervical adenitis responds well to ultra-violet therapy. In the opinion of unbiased observers, ultra-violet therapy may be a useful adjunct in the treatment of the following conditions: psoriasis, chronic eczema, furunculosis, seborrhœic dermatitis, alopecia areata, purpura, cœliac disease and malnutrition. It should be stated, however, that in most instances it can be replaced by more simple forms of therapy.

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STUDIES IN PERNICIOUS ANÆMIA. III. A CONTRAST OF THE CHLORIDE CONTENTS OF CORPUSCLES AND PLASMA OF BLOOD IN PERNICIOUS ANÆMIA AND VARIOUS OTHER CONDITIONS*†

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THE ANALYTICAL PROCEDURE

IN the second paper of this series Rioch and Cameron[1] described a method for determining the chloride content of the blood corpuscles directly, based on that of Gram[2] for plasma and whole blood. This procedure we have rigorously adhered to, and further prolonged use of it has confirmed our opinion of its accuracy and applicability. The theoretical reasons necessitating its employment were outlined by Rioch and Cameron.

Blood is taken in the morning, before breakfast, and is drawn directly from an arm vein into a syringe containing two drops of 20 per cent potassium oxalate solution. The constant error introduced by this volume of oxalate, about 1 per cent, is neglected. The piston of the syringe has been previously coated with vaseline, and the needle cemented to the syringe with paraffin-wax. The syringe is inverted several times to ensure complete mixing of blood and oxalate, and the blood is then discharged below the surface of liquid petrolatum contained in a 15 c.c. graduated centrifuge tube with constricted neck. With this technique 10 c.c. of blood—the amount usually taken—never comes in contact with more than 0.1 c.c. of air (the bubble contained in the bore of the needle). The centrifuge tube is closed with a rubber cap, and immediately centrifuged at 3000 revolutions a minute in an International No. 2 Centrifuge for 90 minutes. This effects a practically complete separation of cells and plasma. Then one c.c. of plasma and one c.c. of cells respectively are pipetted off in separate standard pipettes, and analyzed by the micro-procedure of Van Slyke.[3] Error in the estimation of the cell chlorides depending on incomplete drainage of the viscous mass from the pipette is almost completely prevented by drawing up petrolatum into the pipette before use; after draining, a thin film remains. This is displaced upwards when the cells are pipetted, and after draining them from the pipette the latter is washed twice with a small volume of petrolatum and the washings added to the cells.

In Van Slyke's procedure 1 c.c. of blood (or plasma) is placed in a 100 c.c. test-tube of Pyrex glass, and 3 c.c. of a solution of silver nitrate-nitric acid (made by dissolving 8.495 grams of silver nitrate in the minimum amount of water and adding nitric acid of specific gravity 1.4 to a volume of one litre) are added, the tube covered by a watch-glass, and digested on the water-bath. When the digestion is completed 6 c.c. of 5 per cent ferric alum in water are added, the solution cooled, and the excess silver is determined by titration with 0.02 *N* potassium thiocyanate (previously standardized against known silver nitrate solution), the number of grams of (sodium) chloride per 100 c.c. material being then 0.117 (7.50 minus number of c.c. 0.02 *N* thiocyanate used).

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† Part I, The outstanding clinical problem and the geographical distribution in Western Canada (E. W. Montgomery), *Canad. M. Ass. J.*, 1926, xvi, 244. Part II, Chloride metabolism in tht anæmias, especially pernicious anæmia (Margaret G. Rioch and A. T. Cameron), *Canad. M. Ass. J.*, 1926, xvi, 251.

Van Slyke's technique calls for two hours' digestion with plasma and 12 hours' digestion with whole blood. Rioch and Cameron reported that two hours' digestion of plasma or of whole blood invariably gave a clear yellow fluid (indicating completion of the reaction), and that six hours' digestion was sufficient for cells. Longer periods of digestion did not appear to be necessary.

We have examined the question of possible change in value with time of digestion more closely. Various blood samples were taken from the same normal subject on different days, but at corresponding times, so that the cell-chloride values may therefore be regarded as approximately constant. In each experiment one c.c. volume of the same sample were digested for different lengths of time (or under conditions modified as will be described). Similar experiments were carried out with pure pre-war "K" Kahlbaum potassium chloride. For convenience the results, shown in Table I, are all expressed in terms of sodium chloride, in percentages.

Rioch and Cameron calculated the error of determination to be plus or minus 0.01 per cent sodium chloride.

The figures in Table I indicate that in the absence of the petrolatum oil, six hours' digestion is sufficient, and that prolonged digestion does not affect the results (experiments 1 and 7). Apparently on prolonged digestion the presence of petrolatum oil leads to an increase in value above the true figures (experiments 2, 3, and 8) presumably due to some interaction between the silver salt and the paraffin itself; this is not corrected by addition of more nitric acid immediately prior to titration (experiments 4 and 9) and the cause of this error has not been ascertained.

The lower value obtained without use of petrolatum in the pipette (experiment 5) as compared with that when oil is used (experiment 5a on the same blood sample) is obviously due to the incomplete removal of cells from the pipette, as is shown by the contrasted results in experiments 6 (in which the pipette was twice washed with distilled water and the washings added) and 6a (in which petrolatum was used), where the difference does not exceed the limit of error. The low values at first obtained for potassium chloride in experiment 8 seem due to the fact that this solution became entangled in the oil and incompletely removed from the pipette. This does not happen with the blood cells.

Hence it would appear that the actual time called for in the paper of Rioch and Cameron—two hours' digestion for plasma, and six hours for cells—are those which will give values closest to accuracy, and that digestion of the blood corpuscles for periods longer than six hours will lead to too high results in presence of petrolatum oil.

Experimental Data

It has seemed desirable not only to study a larger number of cases of pernicious and secondary anæmia, but also to examine the blood

TABLE I

Effect of Varying the Period of Digestion of Blood Corpuscles

Expt.	*Material*	*Time of Digestion in Hours*					
		0	*2*	*6*	*12*	*18*	*24*
1	Blood corpuscles; no petrolatum used	–	–	0.28	0.29	0.28	0.29
2	Blood corpuscles; with petrolatum	–	–	0.29	0.35	–	–
3	Blood corpuscles; with petrolatum	–	–	0.27	0.28	0.31	0.38
4	Blood corpuscles; with petrolatum and additional nitric acid	–	–	0.32	0.33	0.37	0.38
5	Blood corpuscles; without petrolatum	–	–	0.27	–	–	–
5a	Blood corpuscles; with petrolatum	–	–	0.29	–	–	–
6	Blood corpuscles; with washings	–	–	0.30	–	–	–
6a	Blood corpuscles; with petrolatum	–	–	0.29	–	–	–
7	Potassium chloride (equivalent to 0.34% NaCl); without petrolatum	0.33	0.34	0.34	0.33	0.33	0.33
8	Potassium chloride; with petrolatum	–	–	0.30	0.31	0.37	0.39
9	Potassium chloride; with petrolatum and additional nitric acid	–	–	0.32	0.33	0.37	0.36

TABLE II

Plasma and Corpuscle Chloride Contents in Pernicious Anæmia

Case	*Sex*	*Known duration of condition*	*R.B.C.* $\times 10^6$	*Hb*	*Colour Index*	*Cell Vol.*	*Plasma NaCl*	*Cell NaCl*	*Remarks*
		Years		%		%	%	%	
(1) Active									
Gr.	M	1.5	1.5	39	1.3	15	0.61	0.28	——
MaA.	M	Recent	2.8	52	0.9	26	0.59	0.25	Nervous type
Co.	M	0.25	1.6	40	1.3	15	0.59	0.25	——
Bu.	M	Recent	2.4	56	1.2	—	0.62	0.24	——
Yo.	M	Over 3	1.1	26	1.2	10	0.62	0.19	——
(2) In remission									
Ha.	M	Over 6	4.0	80	1.0	31	0.60	0.26	Repeated (cf. R. and C.)
Mo.	M	Recent	5.1	70	0.7	34	0.57	0.26	——
Ha.	F	Over 2	4.4	78	1.1	34	0.61	0.25	Repeated (cf. R. and C.)
Bi.	F	3	4.8	76	0.8	32	0.56	0.24	Repeated (cf. R. and C.)
Av.	M	Recent	4.1	68	0.8	35	0.57	0.24	Nervous type (?)
Ro.	M	1.5	3.4	68	1.0	23	0.57	0.20	——

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TABLE III

PLASMA AND CORPUSCLE CHLORIDE CONTENTS IN DIABETES MELLITUS

Case	*Age*	*Sex*	*Known duration of condition*	*R.B.C. × 10⁶*	*Hb*	*Colour Index*	*Cell Vol.*	*Plasma NaCl*	*Cell NaCl*	*Blood Glucose*	*Remarks*
			Years		%		%	%	%	%	
Br.	45	F.	Over 4	4.8	92	1.0	40	0.58	0.29	0.12	Has never had insulin
Wa.	25	F.	Over 7	4.9	80	0.8	32	0.54	0.26	0.10	(1.5 hrs. after small breakfast). Balanced on insulin
Jo.	15	F.	2	4.2	80	1.0	31	0.59	0.25	—	Balanced on insulin
Bi.	56	M.	Over 3	4.6	84	0.9	32	0.56	0.25	(above normal)	Complicated by nephritis Not on insulin.
Ho.	60	F.	3	4.2	80	1.0	40	0.54	0.22	0.22	Excreting a slight amount of glucose. Not on insulin
Fl.	28	M.	2	5.1	98	1.0	37	0.51	0.22	0.23	Excreting sugar. Not on insulin
Ed.	65	F.	Advanced	4.1	60	0.7	29	0.55	0.21	—	Leg ampd. for gangrene 6 weeks before. Not excreting sugar. Balanced with insulin
Ta.	74	F.	Recent (?)	4.7	94	1.0	35	0.57	0.26	0.47	Excreting much sugar. Condition just discovered

TABLE IV

PLASMA AND CORPUSCLE CHLORIDE CONTENTS IN VARIOUS CONDITIONS

Condition	*Case*	*Sex*	*R.B.C. × 10⁶*	*Hb*	*Colour Index*	*Cell Vol.*	*Plasma NaCl*	*Cell NaCl*	*Remarks*
				%		%	%	%	
Secondary anæmia due to:									
Carcinoma	At.	M.	1.7	16	0.5	10	0.59	0.35	—
Carcinoma	Ea.	F.	4.3	58	0.7	31	0.61	0.34	—
Carcinoma	Co.	M.	2.9	35	0.6	—	0.60	0.32	—
Carcinoma	McR.	F.	4.1	42	0.5	20	0.60	0.27	—
Hæmorrhoids	Ll.	F.	1.5	36	1.2	12	0.58	0.33	Repeated (cf. R. and C.)
Hæmorrhoids	Fr.	M.	3.0	37	0.6	17	0.64	0.28	—
Operation	McK.	F.	4.1	60	0.7	27	0.59	0.29	—
Childbirth	Mi.	F.	5.8	72	0.6	28	0.56	0.29	—
Menorrhagia and metrorrhagia	Wh.	F.	1.8	20	0.6	11	0.57	0.30	—
Leukæmia									
Lymphatic	McI.	M.	3.5	62	0.9	21	0.64	0.27	—
Myelogenous	Sa.	F.	2.9	48	0.8	15	0.54	0.33	(Some anæmia?)
Nephritis	Th.	M.	4.0	78	1.0	35	0.58	0.30	—
	Yo.	M.	6.0	94	0.8	56	0.61	0.30	Blood urea—N 57 mg. per 100 c.c.
Nephrosis (of thyroid origin)	McD.	F.	4.2	72	0.9	30	0.59	0.29	—
Intestinal obstruction (from carcinoma of stomach.)	Sw.	M.	5.9	87	0.7	46	0.50	0.22	—
(ileus following gall-bladder operation)	Ca.	F.	3.0	55	0.9	34	0.54	0.25	—
Arteriosclerosis	Po.	F.	4.7	71	0.8	33	0.58	0.25	—
Rheum. arthritis	Mo.	F.	4.2	78	0.9	39	0.57	0.28	—
Syphil. aortitis	Lu.	M.	3.9	88	1.1	34	0.57	0.30	—
Lung abscess	Hi.	M.	4.8	77	0.8	41	0.59	0.31	—
Multiple abscesses of right kidney	Ri.	F.	4.3	70	0.8	25	0.45	0.21	Blood urea–N 199 mg., creatinine 7.5 mg., sugar 95 mg. per 100 c.c. (Jan. 17)
			4.3	74	0.9	18	0.60	0.27	Blood urea–N 32 mg., creatinine 2.4 mg. per 100 c.c. (Feb. 21)

TABLE V
SUMMARY OF CHLORIDE RESULTS

Condition	No. of cases	Plasma–NaCl			Cell–NaCl		
		Min.	Max.	Average	Min.	Max.	Average
		%	%	%	%	%	%
Normal subjects	18	0.55	0.62	0.593	0.26	0.32	0.288
Active pernicious anæmia	16	0.56	0.62	0.601	0.19	0.30	0.241
Pernicious anæmia in remission	8	0.56	0.61	0.581	0.20	0.30	0.251
Diabetes mellitus	8	0.51	0.59	0.555	0.21	0.29	0.245
Intestinal obstruction	2	0.50	0.54	0.52	0.22	0.25	0.235
Secondary anæmia (all causes)	20	0.56	0.64	0.592	0.24	0.39	0.310
Secondary anæmia (carcinoma)	6	0.56	0.61	0.593	0.27	0.35	0.320
Chronic chlorosis	9	0.57	0.62	0.598	0.24	0.39	0.318

in a number of other conditions to ascertain whether variations from normal chloride content existed, and if so to what degree. The results of this study are given in Tables II, III, and IV. For convenience all figures are expressed in terms of sodium chloride. Cases already reported by Rioch and Cameron and now repeated are indicated in the remarks column.

ANALYSIS OF RESULTS

The groups of cases for which data have been presented in this and the previous paper of Rioch and Cameron are summarized in Table V.

Normals.—It has seemed justifiable to exclude a doubtfully normal case with a somewhat abnormal gastric acidity curve and the definitely low cell-chloride value of 0.23 per cent.

Active Pernicious Anæmia.—The new results are in good agreement with those already presented, and call for no further comment.

Pernicious Anæmia in Remission.—One of the cases previously reported, Mrs. Br., at subsequent post mortem examination was shown to be a case of carcinoma of the stomach with marked liver metastases, while there was no definite evidence of pernicious anæmia, although the earlier history strongly suggested it. The figures found for this case must therefore be regarded as due to secondary anæmia, and must be excluded from the series.

The three other cases previously reported, and five new cases (of which two were previously examined in the active stage) show figures in good agreement with those obtained for active pernicious anæmia. The case of Ha. (male), active in the first report, with values of 0.61 and 0.22 per cent, now shows corresponding values of 0.60 and 0.26 in remission, suggesting some regression towards normal. But case Bi. (female), with the same change in condition, shows the two sets of values 0.60—0.23 and 0.56—0.24 per cent, with no definite change in cell chloride. Case Ha. (female) in remission in the earlier and in the present report, gave the two sets of figures 0.61—0.27 and 0.61—0.25 per cent.

Diabetes Mellitus.—The results show low values for both plasma and cell chlorides and suggest that the extent to which the values are lowered bears some—though no very definite—relation to the acuteness of the condition; balancing the metabolism with insulin tends to restore the values to normal.

Intestinal Obstruction.—The two cases examined showed definitely low values for both plasma and corpuscles; in the more marked there is no evidence of anæmia.

Other Conditions.—The values for the secondary anæmias are in good agreement with those previously recorded, the tendency to higher values for cell-chlorides becoming more evident. No new values for the condition of chronic chlorosis are presented. Most of the other conditions examined showed normal values. A marked exception was the last case in the tables, operated on a year previously for multiple kidney abscesses, and now showing a recurrence of the condition, and presenting extremely low values for both cell and plasma chlorides. Following the second operation the patient recovered rapidly. Three weeks later (February 21st) chlorides were practically normal.

DISCUSSION OF RESULTS

Rioch and Cameron drew the following conclusions:

"The plasma chloride is relatively constant and normal in the anæmias.

"In the active stage of pernicious anæmia, especially when the hæmolytic changes precede nervous symptoms, there is a slight but undoubted lowering of cell chlorides.

"In the remissive stage of pernicious anæmia, and in the other anæmias studied, the average figure for cell chlorides does not markedly differ from normal, but the extremes show wider variations."

The last statement requires modification with respect to pernicious anæmia in remission, in which the cell-chloride remains low, and, as has just been pointed out, in secondary anæmias the cell-chloride values tend to become high in the majority of cases.

The united results show that while the plasma chloride is not definitely affected in the anæmias, the cell-chloride is lowered in pernicious anæmia, and especially tends to show high values in secondary anæmia associated with carcinoma, and in "chronic chlorosis" the conditions most likely to be confused with pernicious anæmia when clinical diagnosis is uncertain.

We are, accordingly, employing the determination of the cell-chloride as an additional diagnostic aid to differentiate between pernicious and secondary anæmia, using the following limits:—

Cell-chloride below 0.26 per cent: pernicious anæmia probable.

Cell-chloride between 0.26 and 0.30 per cent inclusive: no conclusion possible.

Cell-chloride above 0.30 per cent: pernicious anæmia excluded.

In marked contrast with the *low cell-chloride but normal plasma-chloride* in pernicious anæmia are the *low cell-chloride and low plasma-chloride* in diabetes mellitus and acute intestinal obstruction. The cause of the fall in diabetes mellitus has been suggested (cf. Myers[4]) as a compensation for the increased blood glucose, so that a constant osmotic pressure is maintained. It is only natural that, if this likely hypothesis be the true reason, the distribution of chloride between cells and plasma will be equally affected. A similar explanation can be offered for the lowered values in both corpuscles and plasma in the case of abscessed kidney, with marked increase in blood urea, presumably affecting osmotic conditions in both corpuscles and plasma and requiring osmotic compensation. As this patient recovered, and blood urea fell towards normal values, the blood chlorides rose to practically normal values.

The lowering of chloride in acute intestinal obstruction is, according to Haden and Orr,[5] due to its rapid removal, involved in a process of detoxication; here also the chloride depletion may be expected to affect both cells and plasma. But in this condition also there is known to be a marked increase in the non-protein constituents of the blood, so that osmotic compensation may be a factor.

It may be deduced on theoretical grounds that the lowered cell chloride in pernicious anæmia must be accompanied by an alteration in one or more of the cell constituents that cannot pass the cell wall. Either the cation (potassium) content must be lowered, which would involve a lowered osmotic pressure of the cell, and this does not seem to occur, or else there must occur an increase in the non-permeable anion within the cell, the hæmoglobin. It can be calculated that a decrease of (sodium) chloride from 0.3 to 0.2 per cent must have corresponding to it an increase of hæmoglobin of the order of 30 per cent (*i.e.*, 100 volumes of cells should contain 130 per cent of their normal hæmoglobin content). On the other hand where, as in some of the secondary anæmias, cell chloride values are above normal, there must be correspondingly that lowering of hæmoglobin content in these cells which is known to occur, and which is reflected in the lowered colour index. Such changes would explain the occurrence of dyspnœa in secondary anæmia (lowered cell volume plus lowered hæmoglobin content within this cell volume) as contrasted with relative absence of dyspnœa in pernicious anæmia (lowered cell volume with partial compensation through increase of cell hæmoglobin). *The lowered cell-chloride in pernicious anæmia*, if this reasoning be correct, *must be regarded as the sequence to the increased cell-hæmoglobin, being an osmotic adjustment, and in no way directly connected with that abnormality of chloride metabolism which the disease exemplifies in gastric achlorhydria.*

The colour index in pernicious anæmia is frequently above unity, in agreement with a possible increase in hæmoglobin content of the cells. In the measurements recorded in this paper while the cell volume was accurately ascertained, the hæmoglobin content was only determined by

a standardized Dare apparatus, since, initially, the figure was required only to obtain an approximate colour index figure. We propose to determine as accurately as possible in a series of cases the cell volume, hæmoglobin value, and cell-chloride value, to ascertain whether a definite relationship between hæmoglobin and chloride content of the cell can be demonstrated experimentally.

Summary of Results

Plasma chloride contents in the anæmias are constant.

Cell-chloride contents in pernicious anæmia (active and remission stages) are low.

Cell-chloride contents in the majority of cases of secondary anæmia tend to be above normal.

By Contrast

Plasma and cell-chloride contents are both lowered in diabetes mellitus and other conditions where increase of blood constituents requires osmotic compensation, and in acute intestinal obstruction.

The lowered cell-chloride content in pernicious anæmia is probably due to an osmotic adjustment to an increased cell-hæmoglobin content.

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SOME OBSERVATIONS ON CHRONIC HYDROCEPHALUS WITH REPORT OF A CASE APPARENTLY ARRESTED

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ALL cases of chronic hydrocephalus are the end result of an excess in the amount of cerebro-spinal fluid secreted over the amount absorbed. This end result is the same whether secretion is normal, with lower than normal absorption, or whether it is abnormally increased while the absorption remains normal or nearly so. The results of surgical interference with the object of increasing absorption have not been very successful, and the procedures are often difficult and fraught with grave dangers for the little patients. Our surgical goal is to balance the secretion of cerebro-spinal fluid with its absorption. We are contending with a condition of too much fluid in the ventricles, and we can greatly decrease the amount of cerebro-spinal fluid secreted by the choroid plexus by ligating the two common carotid arteries. This comparatively simple operation if carefully done should not be hard on the little patient and will do much to restore the desired balance. The only dangers of this operation are shock and cerebral degeneration.

The Prevention of Shock

After ligation of one artery ten days should elapse before the other common carotid is ligated. The closing of the second vessel should not be done abruptly but very slowly, taking at least two minutes to completely stop the flow of blood. If it is done too abruptly, a fatal syncope may be precipitated.

When the ligation is completed the apparent shock is tremendous. The colourless lips, the alabaster pallor of the face, the more or less dilated pupils, the formerly pulsating, bulging fontanelle now motionless and the momentary cessation of breathing, complete the truly startling picture. This tremendous shock very

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happily is only apparent, as the heart goes on undisturbed with practically no change in its rhythm, and the catch in the breath is but for a moment although the extreme pallor remains for many weeks.

The Prevention of Cerebral Degeneration

The cases of cerebral degeneration that have been reported following the ligation of a common carotid show it to have come on ten or twelve days after the operation. In these cases it could not have been due to the anæmia caused by the ligation (the period between ligation and onset is too long) but must have been due to an embolism from damaged endothelium in the artery.

Therefore, for a ligature use a good stout silk about No. 9 English (or if you prefer, a Perthe ligature) and tie it slowly, watching the distal pulsations in the artery, and tie it *only tight enough to stop these pulsations.* This will not damage the endothelium and any danger of embolism with its consequent cerebral degeneration is removed. To insure the ligation tie another ligature one-quarter inch proximal to the first.

Discussion

Researches would seem to indicate that cerebro-spinal fluid is secreted by the endothelium of the spinal canal as well as by the choroid plexus.[1] Some anatomists claim that in many normal individuals the foramen of Majendie does not exist.[2] In view of this, is it not possible that we overestimate the importance of the circulation of the cerebro-spinal fluid via this foramen?

We are endeavouring to bring the ratio of secretion and absorption of cerebro-spinal fluid to its normal level, so in all cases of chronic hydrocephalus obstructive and communicative (in other words congenital and acquired) I would advocate decreasing the amount of secretion by ligation of both the common carotid arteries. This, combined with aspiration of the ventricles or lumbar puncture for its immediate effect, and pressure bandages when indicated, should be the best and simplest method of treatment of these cases. If, after the common carotids have been ligated, the intra-cranial pressure increases or remains the same and shows no permanent decrease following an aspiration, one would be perfectly justified in ligating one of the vertebral arteries.

In justice to this procedure, I feel I should not close without referring to two conditions which, surgically at least, are very closely allied to chronic hydrocephalus, namely, the various cephaloceles and the various spinæ bifidæ. The end results of surgical interference in these cases is notoriously unsatisfactory because of the subsequent hydrocephalus. All such cases should receive the benefit of ligation of the two common carotids as a pre-operative measure before any surgical procedure is undertaken on the lesion itself. This will greatly enhance the chance of a cure. If after operation hydrocephalus follows despite this measure, the amount of cerebro-spinal fluid secreted being still too great, one of the vertebral arteries should be ligated.

Case Report

L. N., female, aged 9 months.

Family History.—Presents nothing of importance. Parents, two brothers and two sisters alive and perfectly normal.

Personal History.—Born in normal labour. Mother thinks the child had a large head at time of birth. Since that time it has been getting larger and the child at nine months cannot see, keeps rolling its eyes about and apparently does not hear well.

Physical Examination.—Fairly well nourished child with large head, twenty inches in circumference. Respiratory, digestive, cardio-vascular systems, etc., apparently normal.

Special Examination.—The head is twenty inches in circumference: fontanelles bulging and pulsating. Sutures are separated one-quarter of an inch. Baby cannot sit up and pays no attention to its surroundings. Head rolls helplessly from side to side. Eyes continuously moving aimlessly about. Pupils react to light. Under chloroform anæsthesia the discs are found to be much swollen, the veins being about four times as large as the arteries. Four c.c. of fluid were withdrawn from the left lateral ventricle by puncture through the anterior fontanelle and three c.c. of a 1 per cent solution of methylene blue were injected to replace it. One half-hour later a lumbar puncture drew off spinal fluid that was stained with methylene blue. Both blood and spinal fluid gave negative Wassermann and Kahn reactions.

Diagnosis.—Chronic obstructive hydrocephalus (congenital).

Treatment.—Ligation of the left common carotid artery was performed above the omo-hyoid muscle, and ten days later the right common carotid artery was ligated in a similar position.

Progress Notes.—Immediate recovery was uneventful. The pulsations of the bulging fontanelles stopped immediately. In 24 hours they were much softer and in 48 were not bulging at all. Nine months later the head was 20 inches in circumference and was held more or less erect. The fontanelles and sutures were closed. The eyes wandered at times but not at all to the extent they did before. The child saw objects placed three feet away and asked for articles of food such as cookies. It was able to crawl and could sit up alone. Eye grounds were apparently normal.

Two years later.—She is a well developed child whose

head while it looks perhaps a little large (21 inches) seems perfectly normal. She is able to walk about by holding on to window-sills and chairs, and takes a few steps alone. She sees and names objects placed before her, three or four feet away; for example, a knife, fork, spoon, apple, orange, etc., and the eyes very seldom wander. Mentally, for a child of two years and nine months she is more than normal in development. She can count up to twelve, repeat nursery rhymes such as "Rock a-bye baby on the tree-top", "Jack and Jill went up the hill," etc.; she can also sing songs and not only has the words correct, but keeps the tune in a truly surprising way. She is full of childish questions; can spell several words, such as dog, cat, cart, hen. In short she is an apparently normal child.

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AN ANALYSIS OF ULCER OF THE STOMACH AND DUODENUM

BASED ON A STUDY OF NINE HUNDRED AND FORTY-FOUR CASE REPORTS

BY RALPH LYNCH, M.D.

From the Clinic of Dr. C. P. Howard, Montreal General Hospital

IN the autumn of 1926, one of the senior physicians of the Montreal General Hospital, was called in consultation by a surgeon and an internist and was asked to give his opinion on the management of a duodenal ulcer patient, who had suffered two severe hæmorrhages within a period of 48 hours. The surgeon had raised the question of the advisability of immediately ligating the pancreatico-duodenal artery, as in his opinion the patient would not survive a third hæmorrhage. The internist demurred at such a radical procedure on the ground that the patient was too ill to withstand the ordeal of an operation.

The consulting physician favoured expectant treatment, and advanced the argument that in his experience, fatal hæmorrhage in duodenal ulcer, was unusually rare. To this, the surgeon responded that the severe hæmorrhage cases were usually admitted to the surgical side, and therefore escaped the observation of the medical department.

This controversy prompted us to look up the incidence of fatal hæmorrhage from peptic ulcer in the Montreal General Hospital. Having begun this investigation, we thought it worth while to make in addition to the studies of hæmorrhage, a general statistical analysis of gastric and duodenal ulcer. A study of this kind has not been made in comparatively recent years.

Included in this series are all cases diagnosed gastric, pyloric, duodenal or peptic ulcer, regardless of the service to which they were admitted. A clinician's diagnosis of ulcer, whether proved or not, was sufficient to place the case in this series. We realize that this is a rather inexact method of selection and doubtless, a number of these diagnoses are incorrect. However, if the series were restricted to ulcers proved at operation or autopsy, we could study only those cases in which medical or surgical treatment or both, had failed.

The hospital records for the ten year period, 1917 to 1926 inclusive, formed the basis of this analysis, and we wish to thank Drs. H. A. Lafleur, C. A. Peters, A. H. Gordon, E. M. Eberts, A. T. Bazin, and others of the Montreal General Hospital Staff, for permission to use their cases.

INCIDENCE

In a total of 64,917 admissions, there were 944 cases of ulcer; a frequency of 1.45 per cent. At the Montreal General Hospital in 1904, the incidence was 0.88 per cent. Howard[1] in 1904, reported the figures from 15 hospitals in the United States and Canada, and showed an average incidence of 0.57 per cent.

These older figures are not comparable, however, for duodenal ulcer was almost an unknown quantity at that time, and the incidence given, was almost exclusively that of gastric ulcer. Of the 944 cases 690 or 73 per cent were males, while 254 or 27 per cent were females.

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As to the *location* 541 or 57 per cent were duodenal, 380 or 40.6 per cent gastric, and 23 or 2.4 per cent were peptic. All pyloric ulcers were classified as gastric. The records for 1917 showed that gastric ulcers predominated in the ratio of 4 to 1. In 1926, duodenal predominated, the ratio being a little better than 4 to 1.

The duodenal ulcer was the more common in all studies, though the exact proportion was subject to considerable variation. Eggleston[2] found 97 per cent duodenal to 3 per cent gastric; Mayo[3] noted 73 per cent duodenal and 27 per cent gastric, while Baetjer and Friedenwald[4] reported 43 per cent duodenal, 40 per cent gastric and 14 per cent pyloro-duodenal.

Race and nationality. Almost 100 per cent of the cases were white. There were no negroes and only 2 belonged to the yellow race. Birthplaces were recorded in 581. Of these, 40 per cent were born in Canada, 35 per cent in the British Isles, 7 per cent in Russia, 7 per cent in Continental Europe, 5 per cent in the United States of America, 2 per cent in Newfoundland, and 0.3 per cent in China.

The *occupation* was given in 528 cases. These were classified roughly as follows: skilled workers, 40 per cent; office work, clerical, executive or professional, 30 per cent; housework, 17 per cent; labour, 13 per cent.

The *age* was recorded in 897 cases. The percentage in the various age groups was as follows:

Under 20	1	per cent
In the twenties	18	"
In the thirties	30	"
In the forties	27	"
In the fifties	14	"
In the sixties	7	"
Over seventy	1	"

Fifty-seven per cent occurred between 30 and 50. This corresponds with the usual figures, though McCrae[5] states that in females, the majority of cases occur between 15 and 25.

Etiological Conditions

Infections.—According to the past medical histories of these cases, 10 per cent had had typhoid fever, 7 per cent pneumonia, 5 per cent epidemic influenza 0.3 per cent rheumatic fever, and 3 per cent acute nephritis.

Trauma.—An abdominal injury preceding the onset of gastric symptoms was noted in 16 or 1.6 per cent.

Alcohol.—Two hundred and twenty-two or 23 per cent acknowledged the use of alcohol in some form. No attempt was made to divide this group into occasional, moderate or excessive drinkers.

Associated Conditions.—Symptoms of syphilis together with a positive Wassermann were found in 19 or 2 per cent; tuberculosis in 11 or 1 per cent; carcinoma in 3 or 0.3 per cent.

Focal Infections.—Focal infections were included, only when they had been seen and diagnosed by a dentist, or a nose and throat man, in consultation. On this basis, 79 or 8 per cent had dental infection; 35 or 3 per cent tonsillar and 6 or 0.6 per cent sinus infection.

Symptomology

The frequency of the various symptoms is detailed as follows:—

Localized abdominal pain	71	per cent
Loss of weight	34	"
Constipation	26	"
Nausea	19	"
Hæmatemesis	12	"
Vomiting	36	"
Melæna	26	"
Relief by food	25	"
Relief by soda	19	"
Anorexia	12	"

Localized abdominal tenderness was present in 397 or 40 per cent.

Gastric Analysis.—The test meals recorded were 477. For the purpose of this study, a total acidity of over 55 was considered hyperacidity; from 20-55 was considered normal, below 20 hypoacidity. With these standards, 275 or 57 per cent showed hyperacidity. One hundred and sixty-one or 33 per cent were normal and 41 or 8 per cent showed hypoacidity.

In a study made in 1904, Howard[6] reported hyperacidity in only 27.5 per cent of the cases. It is evident that hyperacidity is not by any means a 100 per cent finding, and it seems probable that the significance of hyperacidity has been greatly exaggerated.

In 129 or 13 per cent the red blood cell count was under four million. In 171 or 18 per cent the white blood cell count was above 9,000.

X-ray Reports.—A barium series of examinations were recorded in 609 cases. In 247 or 40 per cent the report was definitely positive; 203 or 34 per cent were reported as being suggestive; 159 or 26 per cent were negative.

The improvement in the radiology of the

stomach and duodenum is readily seen in a study of this kind. In 1918, 14 per cent of the x-ray examinations were positive; in 1926, 71 per cent were positive.

Perforation occurred in 87 or 9 per cent.

Hæmorrhage

Cases with *hæmorrhage* were classified under four headings as follows:

(1) Gross; (2) Visible; (3) Occult; (4) Reported in history of case.

Gross.—In this group were placed all cases in which copious bleeding actually occurred in hospital and was recorded on the chart.

Visible and Occult.—Under this heading was grouped all those in whom bleeding was detected by visual and chemical examination of the stools, as reported from the clinical laboratory.

In the fourth group were placed those in which a report of hæmatemesis or melæna, or both, was described in the history.

One or more of these defined types of bleeding were present in 293 or 31 per cent of the series. There were 52 cases in which the hæmorrhage was reported as gross, 49 in which the blood was visible, and in 185 the hæmorrhage was described as occult, while only a history of hæmorrhage was obtained in 166. It will be noted that the total of the four groups does not tally with the total number of hæmorrhages. This is explained by the reduplication that occurs in the four groups, *i.e.*, a case of gross hæmorrhage may have also a positive occult blood test, and perhaps a history of previous bleeding.

The number of gross hæmorrhages may seem surprisingly small. Fifty-two cases in a series of 944 or 5.5 per cent is a figure considerably lower than that usually given. It should be remembered, however, that this definition of gross hæmorrhage excludes a large number of legitimate cases. A patient may have had a bona fide history of severe bleeding; he may have been observed during a hæmorrhage by a relative, or even a physician; but our figures include only those hæmorrhages that actually occurred in this hospital.

Treatment.—Of the 52 cases of gross hæmorrhage 31 were treated medically. The medical régime in this hospital may be summarized as follows:—

Absolute rest in bed is insisted upon, with the foot of the bed elevated; complete mental quiet is provided by the absence of visitors, by the screening of the patient in a public ward, and by the administration of morphine in large doses. A light ice bag, suspended from a frame, is applied to the abdomen. Nothing is allowed by mouth for 48 hours, except an occasional piece of cracked ice. The mouth is frequently washed with soft gauze soaked in a suitable mouth wash. No saline is given by bowel, vein or subcutaneous tissues. Blood transfusions are not considered desirable as only contributing to an increase in the blood pressure and possibly a disturbance of the clot that has already formed in the bleeding vessel. Sippy's advice is followed and no blood pressure readings are allowed to be made, and no examinations of any sort carried out, that would in any way, disturb the patient.

After the 48 hours, treatment by alkalization is instituted and the small, frequent feedings, recommended by Sippy are started. Following these principles there were 4 deaths in the 31 cases; a mortality of 13 per cent. Of the 52 gross hæmorrhages 21 were treated by surgical methods. By this is to be understood that operation was performed during the period of active bleeding, or immediately following active hæmorrhage. Under this surgical management there were 9 deaths in the group of 21 or a mortality of 43 per cent.

TABLE I
Management of Gross Hemorrhage

Treatment	*No. of Cases*	*No. of Deaths*	*Percentage Mortality*
Medical	31	4	12.9%
Surgical	21	9	42.8%

In the management of the ulcer 676 or 72 per cent were treated by medical methods; 268 or 28 per cent by a surgical operation. There were 41 deaths in this series of 944; a mortality of 4.1 per cent. In the 87 cases of perforation, there were 23 deaths; a mortality of 26 per cent.

Features of Gastric Ulcer Contrasted With Those of Duodenal Ulcer

A table is submitted, in which the age, sex, symptomology, incidence of perforation, and fre-

quency of operation, in the two groups, gastric and duodenal, are compared.

A record was kept of every case in this series that received a Lenhartz or a Sippy diet. For convenience, we excluded cases that were on "soft," "smooth," or other unstandardized diets, nor was there any record made of Lenhartz or Sippy diets started after operation. In this manner, we collected 512 cases that had had a thorough trial under either Lenhartz or Sippy management. Almost all cases treated were improved to some extent by medical management, but we classed as "relieved" only those that were entirely free from symptoms.

One hundred and fifty-three cases of gastric ulcer received the Lenhartz diet, and 100 of these, 65 per cent were relieved of symptoms. 57 were under Sippy management with 35 or 60 per cent obtaining relief from symptoms.

One hundred and sixty-five cases of duodenal ulcer received the Lenhartz diet; 129 or 78 per cent were rendered free from symptoms; 137 were treated by the Sippy method, with 112 or 81 per cent getting relieved of symptoms.

Comment

An analysis of the records of 944 cases of gastric and duodenal ulcer has been presented.

The figures on the management of gross hæmorrhage lead one to believe that the expectant method is to be preferred in these cases. We do not deny that surgical consultation is indicated in recurrent gastric hæmorrhage, but operation should be postponed until bleeding has subsided and the patient's systemic condition has considerably improved. It is not possible to name a definite time as the optimum moment for operation, but as a rule, some four or five weeks after the subsidence of hæmorrhage, the patient

TABLE II

A Comparison of Age, Sex, Symptoms, etc., in the Two Groups—Gastric and Duodenal

Factor Compared		*Gastric*	*Percentage*	*Duodenal*	*Percentage*
1. Incidence		380	40.6%	541	57%
2. Sex	Male	226	60%	446	82%
	Female	154	40%	95	18%
3. Age	Under 20	6	1.6%	8	1%
	20 – 30	65	17%	102	18%
	30 – 40	105	28%	156	29%
	40 – 50	89	23%	135	24%
	50 – 60	56	14%	74	13%
	60 – 70	32	8%	34	6%
	Over 70	4	1%	8	1%
4. Symptoms	Pain	261	69%	396	73%
	Vomiting	169	44%	176	32%
	Hæmatemesis	70	18%	44	8%
	Melæna	89	23%	163	30%
5. Perforation		19	5%	62	11%
6. Operation		116	30%	144	26%

Four rather striking differences are evident in this table, *viz.*, the higher percentage of females in the gastric group; the increased incidence of hæmatemesis, and of vomiting in the gastric, and the greater frequency of perforation in the duodenal.

TABLE III

Medical Management

Location of Ulcer	*Diet given*	*Number of Cases*	*Relieved of Symptoms*	*Percentage relieved*
Gastric	Lenhartz	153	100	65%
Gastric	Sippy	57	35	60%
Duodenal	Lenhartz	165	129	78%
Duodenal	Sippy	137	112	81%

will be taking an ample diet, his red cells will approach four million and his condition should make him a good surgical risk.

The result of the study of the medical treatment, indicates that 62.5 per cent of gastric and 79.5 per cent of duodenal respond to Lenhartz or Sippy management.

Alvarez[7] lauds the Sippy method because it works, but criticizes it because of its complexity. We use the Sippy in the medical wards, and housemen and nurses alike deny any complex, or laborious details in connection with it. We agree with Alvarez however, in believing that frequent feeding, rather than alkalinization, is the point of importance. Many patients do well without alkalinization. Maclachlan[8] has not used alkali for several years and he has the usual number of responses to medical management.

The tendency of ulcers to respond to a diet, the so-called "therapeutic test" is a most important element in the management of these cases. The relief of symptoms that follows the institution of a dietary régime, is scarcely less striking than the action of quinine in malaria.

The failure to get relief from a standard system of diet, should make the internist question his diagnosis; neurasthenia should be carefully excluded. Should he, however, be convinced that there is an anatomical lesion, he must conclude that since the case does not respond to the therapeutic test, it is one that is complicated by adhesions, gall bladder disease, etc. In any event, it is an ulcer that is not amenable to medical treatment and a surgical consultation is indicated.

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A CASE OF COMPLETE HEART BLOCK, WITH EVENTUAL RECOVERY OF NORMAL RHYTHM; IN ASSOCIATION WITH FIBROMYOMA OF STOMACH

BY C. A. McINTOSH, M.D.

Montreal

THIS case first came under medical observation in the Royal Victoria Hospital (service of Dr. J. C. Meakins) on August 16, 1914. He was a fireman by occupation, aged 51 years, who entered the hospital complaining of fainting spells and pain in the head. His illness had begun six days prior to this when, while attempting to raise a window, he fell on his face, and his arms began to twitch. The twitching attacks, or "fits" as he called them, recurred every few minutes and were associated with marked change in his colour. He would be quite flushed for a moment then in a few seconds would become extremely pale. He gradually grew much weaker and was unable to walk. He had some palpitation, but no præcordial pain.

There is little to note in his past history. He was born in England, and came to Canada when 23 years old. He had whooping cough as a child, and gonorrhœa as a young man, but denied other venereal infection. There was no history of rheumatic fever, recurrent tonsillitis, or chorea. He did not smoke but drank whisky moderately. He was married and had three living children. The family history contained no record of cardiac disease.

Physical examination revealed an anæmic but well developed adult. He lapsed occasionally into unconsciousness. During the unconscious periods he was extremely pale and his arms were drawn up in a tremulous manner. These seizures occurred every three to five minutes and lasted for a period of 20 seconds.

The pulse was slow and irregular, some 20 beats to the minute. The vessel wall was readily felt. Marked venous pulsations were present in the neck, the rate of which appeared to be four to six times the radial pulse rate. The heart was not enlarged. On auscultation but one sound was heard, probably the first. This was faint and was followed by a soft blowing murmur. The rhythm was irregular. The liver was palpable one finger breadth below the costal margin. The remaining systems revealed no abnormal physical findings. The urine was normal. The blood pressure was 130 systolic, but on one occasion it rose to 190. The blood Wassermann was negative.

For his first three weeks in hospital the pulse remained extremely slow, from 20 to 48 per minute. For the second three weeks it was faster, 60 to 72. Numerous electrocardiograms were taken, three of which will illustrate the course of events. The first taken on August 18th, two days after admission, shows: complete auriculo-ventricular dissociation, and long intervals during which the ventricle was inactive, and was accompanied by an Adams-Stokes attack.

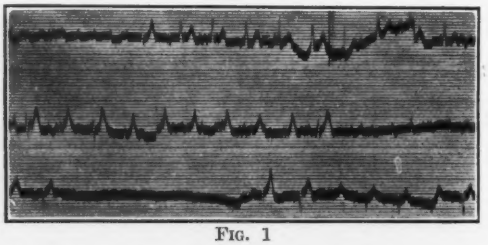

FIG. 1

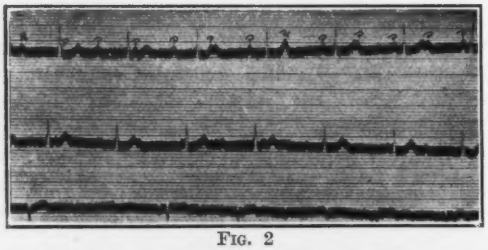

FIG. 2

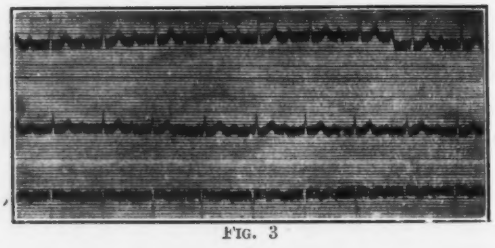

FIG. 3

The second tracing was made 18 days later (September 5th) and shows the heart block to be still present but the ventricular rhythm was regular. Auricular rate 90, ventricular rate 40, per minute.

The third tracing was taken on September 6th, one day after the last tracing, and shows the return to normal rhythm, a left-sided preponderance, delayed P.R. interval of 0.40 seconds and an inversion of the T wave in the third lead.

The fainting attacks disappeared with the return to normal rhythm and his strength returned. Medication consisted of potassium iodide in ten grain doses four times daily. He was discharged from hospital on September 25, 1914, with a diagnosis of complete heart block; general arterio-sclerosis; chronic myocarditis; relative aortic insufficiency.

There appears to have been no return of the previous symptoms, and the second period of hospitalization was from January 8th to February 20, 1923, in the Vancouver General Hospital, to which institution and to Dr. J. M. Pearson, I am indebted for the following data. On this occasion he complained of abdominal discomfort, belching of gas, swelling of the legs and insomnia. During October, 1922, he had had a severe gastric hæmorrhage with tarry stools for 11 days. He was in bed for six weeks, and on getting up he developed œdema of the legs. At this time his heart measured 13 cm. to the left of the mid line, and 3 cm. to the right. An apical systolic murmur was present and a to-and-fro murmur over the aortic area. Blood pressure was, systolic 172; diastolic 70. The pulse was regular. The liver was slightly enlarged, and what was thought to be the spleen was palpable and extended 15 cm. below the costal margin. It was very firm in consistency. Blood count: red blood cells 3,568,000; white blood cells 6,650; hæmoglobin 36 per cent; blood Wassermann was negative. He was discharged improved.

He returned to the Vancouver General Hospital a second time, January 5th to Janury 26, 1925, (two years later), this time complaining of swelling of the feet. He had had another stomach hæmorrhage in December, 1923, and swelling of the feet for eight weeks. His heart measured 12 cm. to the left and 3 cm. to the right of the mid line. The apical systolic mur-

mur was not heard, but a to-and-fro aortic one was present. The pulse was 70, and was regular: the blood pressure was systolic 126, diastolic 60. The liver was still slightly enlarged. The spleen was not palpable, but in the left hypochondrium the sensation was elicited of an indefinite mass. X-ray examination of the gastro-intestinal tract was negative. Red blood cells were 4,900,000; white blood cells 4,300; hæmoglobin 64 per cent. The stools showed no blood. The blood Wassermann was negative. The electrocardiogram showed a prolongation of the P.R. interval, 0.24–0.25, with inversion of the P wave in the third lead. He was again discharged improved.

From June 29th to July 8, 1925, he was a third time in the Vancouver General Hospital (six months later). He had been doing light work but found himself short of breath and unable to walk. There was some œdema of the legs and a palpable mass in the left hypochondrium. X-ray examinations were again negative. An aortic lesion was again thought to be present. The pulse was of the collapsing type. An electrocardiogram showed the P.R. conduction time to be 0.24 seconds.

On September 22, 1926, he was again admitted to the Royal Victoria Hospital. Three weeks before he had become unconscious for a short period. Following this he passed copious tarry stools, and continued to do so for days. His strength failed and his pallor had increased. The evening of admission he had had a sudden attack of pain in the left upper abdomen and vomited about a quart of dark clotted blood. This happened again and his condition appeared extremely grave.

Physical examination revealed marked pallor; his expression was anxious; the heart was 12.5 cm. to the left, 2 cm. to the right of the mid line; the blood pressure was systolic 138, diastolic 32; the heart sounds were weak. An apical systolic murmur was present and likewise one over the aortic area. Pulse 88, regular, and bounding, of the Corrigan type. A large, firm, smooth mass, the size of a cocoanut was palpable in the left hypochondrium, extending under the costal margin and nearly to the umbilicus. No notch was palpable. The blood count showed: 2,250,000 erythrocytes; 7,400 leucocytes; 45 per cent hæmoglobin. The urine was negative except for a trace of albumen.

On September 24th, he vomited about 18 ounces of bright red blood in the afternoon. A second smaller hæmorrhage followed early in the evening. The pulse rate did not rise above 86. He appeared to be suffering from abdominal pain and to be getting gradually weaker and died the following day.

The fatal lesion appeared definitely to be one connected with the gastric hæmorrhage, but there was considerable doubt whether the large abdominal mass was attached to the stomach. There were no evidences of tumour metastases and no emaciation.

At autopsy there was found the following: the heart weighed 600 grm. The auricles showed no gross lesion. The left ventricle measured 1.5 cm. The mitral valve measured 11 cm., the aortic, 9 cm., tricuspid 14 cm., pulmonary 10 cm. Between the posterior and left anterior aortic cusps there were numerous small soft thrombotic vegetations, but no marked valvular deformity. The myocardium of the left ventricle showed many small white areas of scar formation. The coronary arteries were patent throughout, and moderately sclerosed. The aorta showed extensive atheromatous plaques with ulceration and calcification.

Upon opening the abdomen there was disclosed a large semi-soft mass between the greater curvature of the stomach above and the pancreas below. The mass was practically spherical and about 15 cm. in diameter. It was attached to the stomach by a narrow pedicle of 6 cm. The weight of the tumour and stomach combined was 1,750 grms. The displacement of the tumour mass alone was 1,350 c.c. of water. On the stomach wall 6 cm. below the œsophagus near the greater curvature was an irregular ulcer 2 cm. in diameter. In close proximity to this was a small sinus 0.5 cm. in diameter. This communicated with the centre of the mass which was soft, necrotic and hæmorrhagic. The remaining organs showed but little of importance.

Microscopic examination of the heart muscle showed moderate hypertrophy with some fatty degeneration and fibrosis of the myocardium. No evidence of syphilis was found either in the heart muscle or the aorta. The coronaries were

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moderately thickened. The abdominal tumour was found to be a fibro-myoma, probably arising from the muscle coats of the stomach wall. There was relatively little fibrous connective tissue and the muscle fibres seemed to be of mature type.

In conclusion there might be emphasized the following points:

1. Complete heart block with Adams-Stokes attacks in a patient aged 51 years, with recovery and the regaining of normal rhythm.

2. Etiology not definite; possibly arterio-sclerotic.

3. Unusually long P.R. interval, 0.40 seconds, at the time of first admission, and probable persistently prolonged auriculo-ventricular conduction times, 0.24–0.25 seconds 11 years later.

4. A relatively uncommon but not rare type of stomach tumour.

Discussion

Dr. C. L. Conner, Pathologist to the Montreal General Hospital, said, in the discussion which followed, that he had thought from the title of the paper that he was going to hear of a tumour metastasis to the heart with consequent heart block, but this apparently was not the case. Leiomyomas of the gastro-intestinal tract he thought were not infrequent, though least common in the stomach; they were usually small, and fortunately rarely became malignant. As regards tumour metastases in the heart, they usually lodged in the interventricular septum, but towards the apex rather than in the auriculo-ventricular bundle. It would require therefore a very large or unusually placed tumour to affect the bundle. It must be remembered that in a fair number of cases of heart block no definite lesion could be found in the conduction system. The common causes were considered to be arterio-sclerosis, by extension of a plaque from a neighbouring valve; syphilis, either as a gumma or as scar tissue; and acute and chronic affections of the myocardium. He had seen cases in which mycotic aneurisms had perforated the interventricular septum from acute ulcerative lesions of the aortic valves.

Dr. G. E. Brow said that a case such as this brought up several questions. First, what was the etiological factor in this temporary condition of complete heart block which later passed off and gave place to the normal sino-auricular nodal control with a delay in the conduction between the auricle and the ventricle? We naturally looked to the more common causative factors of complete heart block, namely, syphilis, rheumatic fever, or other infective processes, but as Dr. McIntosh had shown, there was no history or finding of this nature. The factor of arterio-sclerosis should next be examined, and there was some evidence that this might be a possible cause. In trying to account for the period of complete dissociation between the auricles and the ventricles in this case it was not very difficult to theorise as to the possible pathology, *e.g.*, one might suggest a temporary thrombosis of the coronary vessel supplying the bundle of His, or even a transient œdema as a result of an infective process which was not recognizable clinically. The fact that a continued complete heart block was not subsequently found would rather suggest that the temporary cause had been partly removed or that a collateral circulation had been established which nourished the bundle sufficiently for impulses to pass between the auricles and the ventricles.

Dr. McIntosh had also shown that in this case a prolongation of the conduction time between the auricles and the ventricles was found amounting to as much as 0.4 of a second. This fact was most interesting, but it had already been pointed out by others; Prof. Thayer of Johns Hopkins Hospital, particularly, had reported that a prolongation amounting to as much as 0.7 of a second had occurred in a case of incomplete heart block. The increased conduction time of 0.4 of a second did not persist in Dr. McIntosh's case, but a definite prolongation of 0.24 of a second was found subsequently to continue, and suggested that some permanent damage to the conducting tissues had occurred.

Secondly, the occurrence of a benign fibro-myoma of the stomach while rather a rare gastric finding and one which eventually led directly to the death of this individual through a profuse uncontrollable hæmorrhage rather emphasised the fact that cases of heart block do not die from their condition of disturbed cardiac rhythm, but rather from the incidence of some intercurrent disease or some such secondary complication as this case showed. These cases showing purely defective conduction between the auricles and the ventricles might continue to live and lead an active life even to an advanced age and if no intercurrent infections or accidents arose might ultimately terminate as individuals with myocardial decompensation.

Dr. W. F. Hamilton said that he did not take so pessimistic a view of the course of heart block cases. He recalled two cases in particular which had been fairly closely studied. One was that of a man now 70 years of age, who occupied a highly responsible position in public affairs and had shown complete heart block for many years. His efficiency was not greatly affected by the condition although he was constantly careful of himself. The other case was a lady who had been known to show the same degree of heart block for at least 18 years. This cardiac condition was associated with hypertension and during this period she had undergone two serious operations, one was for gall stones and the other was hysterectomy. She had led a remarkably active life and while still able to participate socially and otherwise in the community in which she lived her activities are considerably diminished.

These two cases, considered from the standpoint of their years, might well be expected to show some degree of cardiac impairment. It is remarkable how well they have withstood the weight of years with complete heart block.

INSULIN ŒDEMA*

By I. M. Rabinowitch, M.D.

Montreal

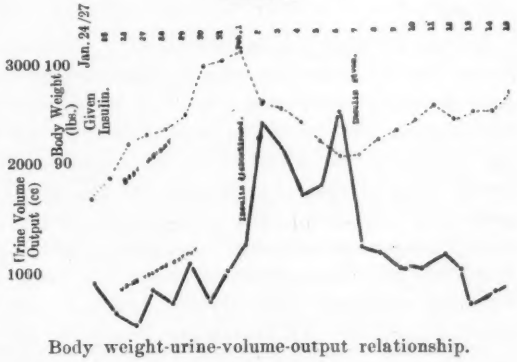
INSULIN produces an œdema of the body tissues of the diabetic, and this largely accounts, in a great number of cases, for the rapid increases of body weight frequently noted. The recognition of this phenomenon is important in order to properly estimate progress in a case of severe diabetes. Little is known either of the reason for this condition or of its significance. The literature is very scanty. The greater part of it has been summarized recently.[1] As far as could be ascertained, the only record of this phenomenon, in the English literature, was the report of three such cases from this laboratory.[2]

The œdema is apparently not one of those forms frequently met with in diabetes prior to the days of insulin treatment. Cachexia, sodium bicarbonate administration, dietetic alterations, and ingestion of large quantities of table salt were the common causes then. Cachexia in diabetes is now, owing to the general availability of insulin, practically unknown. In none of our cases could sodium bicarbonate have been a factor, because it had not been employed in this clinic in the treatment of diabetes since the introduction of insulin. That dietetic alterations do not account for this form of œdema is apparent from the fact that the body weights of patients kept for long periods on diets of constant composition of carbohydrate, fat and protein, salt and water, can readily be made to fluctuate with alterations of insulin dosage. The proof that the rapid gains of body weight are due largely to water retention is the fact that, as the insulin is discontinued, polyuria occurs, and approximately parallels the loss of body weight. The losses in our cases have been found to vary between three and twelve pounds during a period of three days. Though hyperglycæmia gradually increases during the first few days after the insulin is discontinued, glycosuria may frequently be absent. The polyuria thus differs from that of active diabetes. Obviously, if the insulin is discontinued for a greater period of time, the diabetes becomes active, and glycosuria reappears. Following institution of insulin treatment, with no alteration of food or fluid intake, the polyuria disappears, and the patients again begin to gain weight. The following two cases are cited, as typical, in illustration of this phenomenon.

Case 1

A male, aged 35, was admitted to the medical service of Dr. A. H. Gordon on January 19, 1927. He was in a precomatose state. The details of the treatment and laboratory findings until January 24th are omitted, having no particular bearing on the subject under consideration. On January 24th, he looked well clinically and felt well, and was then on a diet compatible with his daily requirements. He was then receiving 40 units of insulin per diem. On that day he weighed 89½ pounds. He was kept on this diet with a constant salt and water intake until February 1, 1927, and on this day he weighed 104½ pounds. He therefore gained 15 pounds during a period of eight days. On this day there was a slight puffiness of the face, and slight œdema of the legs, demonstrated by pitting of the skin on pressure. Insulin was discontinued. A polyuria followed and on February 6th, five days later, he weighed 93½ pounds. Following institution of insulin treatment the polyuria disappeared and he again began gaining weight. The course of events during this experimental period is graphically recorded in Chart 1. Only the body weight-urine volume output relationship is recorded. The other laboratory data are, for the sake of brevity, omitted, having no particular bearing here.

Chart 1



Body weight-urine-volume-output relationship.

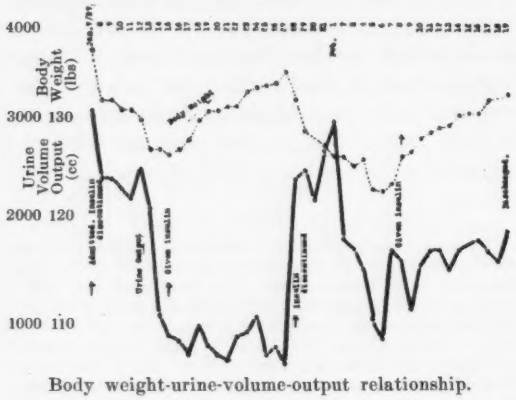
* From the Department of Metabolism, The Montreal General Hospital, Montreal, Can.

This work was done with the technical assistance of Miss Helen Chisholm, who was responsible for all the biochemical analyses.

CASE 2

A male, age 27, was admitted into the medical service of Dr. C. A. Peters on January 7, 1927. He had been treated for diabetes in this hospital since August, 1926. Though he was making good progress clinically, it had been found most difficult to maintain the blood sugar at a normal level. He had some suggestion of puffiness of the face and demonstrable œdema of the legs (pitting of the skin on pressure). On the day of this admission he weighed 138 pounds. The presence of insulin œdema was most strikingly demonstrated in this case. The course of events during the experimental period is graphically recorded in Chart 2. It will be noted that as the insulin was discontinued, polyuria and loss of body weight resulted, and as insulin treatment was instituted, the polyuria disappeared and the body weight increased.

CHART 2



Body weight-urine-volume-output relationship.

A possible explanation of this condition has been sought. In their latest monograph, von Noorden and Isaac[1] state that a single salt free day may cause a significant amount of the œdema to disappear. This suggests salt retention as a cause. In our experience the results of such treatment have not been uniform, and in two cases in which salt restriction has failed, the plasma chlorides have not only been normal, but the salt excretion has practically equalled the salt intake. Salt retention is therefore not the only explanation of this œdema.

Kidney damage was suggested as a possible cause, but the great majority of cases observed have had no albuminuria. In those cases with albuminuria, the latter was present prior to the use of insulin. Renal efficiency tests also were made. These included estimations of the urea, creatinine and uric acid contents of blood, urine-urea concentration following ingestion of urea, the urea concentration factor, the urea secretory constant (van Slyke), and tests of water excretion. As far as the excretion of nitrogenous substances is concerned, no evidence of impaired renal efficiency has been found.

Impaired water excretion has been found in practically every case. The test of this in each case consisted of a combination of the Albarran and Straus-Graunwald methods. That is, normally, following ingestion of about 500 c.c. of water in the fasting state, a polyuria should result within the first half hour, reach its maximum at that time, and rapidly disappear (Albarran) and in three hours the sum of the fluid excreted should equal the sum ingested (Straus-Graunwald). The results of the above renal efficiency tests in three cases, have been reported previously from this laboratory.[2]

It does not necessarily follow that the results of the "water" tests indicate impaired renal efficiency. One would, a priori, expect such results in any form of œdema, and it is well known that œdema may be due to causes other than inability on the part of the kidneys to excrete water.

If, as the observations suggest, the œdema is not due to impaired renal efficiency or retained solids, (salts, etc.) attracting water (an osmotic-pressure phenomenon), the possibility is suggested that in insulin œdema we are dealing with some colloidal phenomenon; that insulin increases the hydration capacity of the tissue colloids of the body. This, however, is only a suggestion.

An attempt has been made to correlate the œdema with the severity of the diabetes, and with quantities of insulin given. It is rather difficult to study these phenomena separately, since insulin dosage as a rule parallels severity. It is interesting,however, to note that œdema, demonstrable by puffiness of the face, or pitting of the skin of the legs on pressure, in the absence of other conditions which might also cause œdema (heart disease, etc.), has been found to be most marked in patients receiving large quantities of insulin (40 units and upwards per diem). This also applies to œdema not demonstrable by puffiness of the face or pitting of the skin on pressure, but demonstrable by polyuria and loss of weight *without glycosuria* after temporarily discontinuing insulin. Oedema by either method could not be demonstrated in moderately severe patients receiving ten units of insulin or less per diem. No œdema could be

demonstrated in two severe diabetics who were kept sugar free by means of under-nutrition diets and small doses of insulin. These findings therefore suggest that the œdema is more likely a function of the dose of insulin rather than of the severity of the diabetes.

No serious attempt has been made to treat this condition. As stated above, the results of salt restriction were not uniform, and were they so, one rather avoids giving diabetics salt free diets. Before the days of insulin, œdema appeared to be helpful rather than harmful to the diabetic; Joslin has pointed out that he remembers having "seen but one patient in coma who showed œdema". In two cases calcium chloride administration was followed by diuresis. If the prevalent explanation of this form of diuresis is correct, we have here further suggestive evidence that in insulin œdema we are dealing with a colloidal phenomenon, an increase in the hydration capacity of the tissue colloids, rather than an inability on the part of the kidneys to excrete water.

The significance of this œdema from the point of view of prognosis is still problematical. In two of the patients who manifest a marked degree of this form of œdema, it is found very difficult to maintain the blood sugar at the normal level. The body weight-urine-volume-output relationship graph of one of these (Case 2) is recorded in this paper. The dosage of insulin in this case fluctuates between 60 and 75 units per day. This patient has taken as much as 100 units per day for a period of over one month while in the hospital, and under careful dietary control, with no manifestation of hypoglycæmia. Contrary, therefore, to the experience of O. Klein, reported by von Noorden and Isaac,[1] it would appear that insulin œdema may manifest itself in an individual refractory to insulin.

It appears that insulin œdema may, at times, be harmful, in view of Joslin's suggestion that it may be a factor in the production of the anuria which develops during coma. It is interesting to note that just as we find a suggestive relationship between insulin dosage and œdema, so Joslin finds such a relationship between insulin dosage and anuria.

I am greatly indebted to Dr. Joslin for permission to refer to the contents of a paper on diabetic coma which he has kindly shown me prior to its publication. This article will appear in the coming Boston Number of the Medical Clinics of North America.

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The Teaching of Bacteriology in London.—The supply of young and well-trained bacteriologists is unequal to the demand for them both in this country and abroad, and this deficiency must be regarded as partly due to a lack of facilities for the training of suitable students. These facilities may be provided either before or after graduation. Bacteriology may be recognized as a subject for a science degree—as is now done at several of the universities—and thus form an important part of the under-graduate's training; at Cambridge a course of bacteriology can be taken, with pathological work, by those who go on to the second part of the Natural Science Tripos. Alternatively, the instruction may be given after medical qualification, and for this purpose it is convenient to provide a whole-time course leading, perhaps, to a university diploma. In London, especially, it is desirable that such courses should be made available, if only as part of the scheme for making London the main centre of post-graduate education within the Empire. It is satisfactory, therefore, to learn of the opening in October next of the Division of Bacteriology and Immunology of the new London School of Hygiene and Tropical Medicine. The board of management has decided to start the work of this division in temporary premises in Gordon-square, pending the completion of the school buildings, and during this interim period a whole-time post-graduate course in bacteriology will be given under the immediate direction of Prof. W. W. C. Topley, who is to occupy the university chair of bacteriology and immunology in the School. It will not be possible to arrange instruction for candidates for the Diploma in Public Health until the accommodation to be provided in the main building becomes available. In the meantime inquiries about the bacteriological course should be addressed to the Director of the London School of Hygiene and Tropical Medicine, at 37, Torrington-square, W.C.1.—*The Lancet*, April 30, 1927.

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THE INTRATRACHEAL USE OF NITROUS OXIDE AND OXYGEN ANÆSTHESIA*

By Ralph Hargrave, M.B.

Toronto

THIS paper is a preliminary report of the intratracheal use of nitrous oxide and oxygen anæsthesia.

Intratracheal ether anæsthesia is now a recognized method for surgery of the head and neck. Difficult facial nose and throat operations have been made easier by its use, post-operative pneumonia has been almost entirely eliminated and post-operative vomiting has been lessened.

Intratracheal ether anæsthesia has been an improvement upon our former methods of administering ether. It occurred to me however, that nitrous oxide oxygen given by the intratracheal method would be a still further improvement on intratracheal ether. My attention was drawn to the administration of intratracheal nitrous oxide oxygen ether anæsthesia in a paper by C. Langton Hewer, M.B., of London, Eng., in the *British Medical Journal* of August 14th. Hewer used this method in gastric surgery, claiming that it reduced post-operative pneumonia to a minimum, gave greater muscular relaxation and minimum respiratory movement.

On January 10th of this year I started a series of cases using Dr. Hewer's method, but without continuing ether with the nitrous oxide and oxygen after anæsthesia had been induced and the catheter inserted. The patient was anæsthetized in the usual manner with ethyl chloride and ether by the semi-closed method until relaxation of the muscles of the lower jaw was obtained. The ordinary intratracheal catheter size 22 French was introduced into the trachea with a Jackson laryngoscope. This catheter was connected with a McKesson gas oxygen apparatus on which had been installed a Connell mercury manometer.

The mixture of nitrous oxide oxygen was administered under pressure and the patient breathed freely and quietly in a light stage of anæsthesia. The patient inspired through the catheter and expired around the catheter. Six facial plastic cases were anæsthetized by this method, the operations lasting from one-half to two hours, at the end of which time, when the catheter was withdrawn, the patient was almost conscious. There was little or no post-operative vomiting, and inside of one-half hour after returning to the ward the patient was completely conscious. One case was very striking, in that six months previously she had been operated on for removal of tonsils under ether anæsthesia and had been nauseated and vomited for three days. With this intratracheal nitrous oxide oxygen anæsthesia, after a two hour operation for the removal of a tumour of the palate, when the catheter was withdrawn she was almost conscious in the operating room and had no post-operative nausea or vomiting whatever.

These six cases demonstrated that intratracheal nitrous oxide oxygen anæsthesia was an improvement over intratracheal ether anæsthesia, but to make this a practical method two disadvantages would have to be overcome. Firstly, the necessity of using the gases at high pressure involves the consumption of both in large quantity which, on account of the high cost, would make their use prohibitive for ordinary anæsthesia. Secondly, the induction with ethyl chloride and ether robs one of some of the benefits derived from a later administration of nitrous oxide and oxygen.

The method that I have worked out up to the present has been on the principle of using a soft rubber catheter which approximates the size of the larynx, and allows the patient to breathe the proper mixture of gases, inspiring and expiring through the same catheter under a very low pressure, thus utilizing the ordinary expiratory valves of the gas machine, no mercury manometer being necessary.

* Read before the Section of Anæsthesia, Academy of Medicine, Toronto, April 26, 1927.

Received for publication April 28, 1927.

Method for Intratracheal Nitrous Oxide Oxygen Anæsthesia

One hour before operation the patient is given a hypodermic injection of hyoscine morphine cactin No. 1 or 2. At the time of operation, with the patient lying on his back on the operating table, the nasal inhaler of the gas oxygen apparatus is placed over the patient's nose, a closed mouth gag placed in his mouth and a warm wet towel applied over it. The patient is then asked to breathe through the nose and the proper mixture of nitrous oxide oxygen given for induction purposes. The ether dial is moved gradually until the jaw is relaxed sufficiently to allow the mouth gag to open it. The laryngoscope is then introduced into the mouth and pharynx, the epiglottis raised with the curved end of the instrument and the vocal cords will now be seen in full view. At this time a spasm of the larynx occurs with a tightening of the cords, but if one waits a few seconds the patient will take a large inspiration, thereby opening up the larynx, and allowing one to insert the rubber catheter which is immediately connected with the mouth piece of the McKesson apparatus on which is an ordinary exhaling valve.

The catheter used is a No. 32, 34 or 36 rectal catheter and I have found that No. 32 fits almost exactly the larynx of young women and boys, that No. 34 is very suitable for men and No. 36 may be used in exceptionally large patients.

The patient breathes naturally to and fro a straight mixture of nitrous oxide and oxygen, very little being necessary, and I believe this pressure is less than that used with the ordinary face mask. The exhaling valve operates the same as when giving gas with the face mask. I have found that one can use nearly 10 or 12 per cent oxygen by this method and still keep the patient anæsthetized.

As soon as the anæsthetic is stopped the patient is allowed to breathe pure oxygen and the catheter is removed. Consciousness is usually regained within one-half hour of returning to the ward. When the catheter is removed a spasm of the larynx occurs which is followed by a very deep inspiration, and I believe at this time that care should be taken that all mucus or blood has been sucked from the pharynx.

In tonsillectomies this method allows the surgeon sufficient time to remove the tonsils and stop any hæmorrhage, and the patient is under the control of the anæsthetist at all times. The large size of the catheter does not seem to be in the way of the surgeon. At the conclusion of a tonsillectomy operation one should connect the catheter, before it is withdrawn from the trachea, with the suction apparatus so that mucus and any blood will not be allowed to flow into the trachea when the catheter is withdrawn.

I believe the amount of ether that is given in the induction stage can be reduced to a very small quantity, or eliminated, according to the skill and speed with which the anæsthetist is able to introduce the catheter into the trachea.

In conclusion let me emphasize the point that this paper is intended to bring before the section a new method for the administration of nitrous oxide oxygen anæsthesia. It has been tried on six patients for the removal of tonsils and adenoids, since anæsthetists are agreed that these cases are among the most difficult to obtain ideal nitrous oxide oxygen anæsthesia. In every case the anæsthesia was perfect both from the point of view of the surgeon and the anæsthetist, and I feel that it is a method worthy of trial for any head or neck operation.

Sample Submitted.—We are indebted to Mr. "Nick" Nicholson, of Vancouver, B.C., for the following clipping: "A printer received an inquiry from a surgeon who wanted bids on several thousand letter heads, different sizes, grades and colours, and he wanted the forms held standing. The printer wrote back: 'Am in the market for one operation for appendicitis, one, two or five-inch incision, with or without ether; also with or without nurse. Quotations must include putting appendix back and cancelling the order if found sound. Successful bidder is expected to hold incision open for sixty days, as I expect to be in the market for an operation for gall-stones, and I want to save the extra cost of cutting.'—*Judge.*"

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HÆMORRHAGE FOLLOWING THE REMOVAL OF TONSILS AND ADENOIDS

By W. J. McNally, B.A., M.Sc., M.D., D.L.O. (Lond.),

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WHILE preparing the annual report of the Royal Victoria Hospital for the Department of Otolaryngology, an attempt was made to investigate any complications which had arisen during the year 1926. In reviewing the cases of hæmorrhage following tonsillectomy and adenoidectomy some facts were noted which it was felt might be of some interest to the profession, and which are here being recorded with the kind permission of Prof. H. S. Birkett, Chief of the Department of Otolaryngology.

For a number of years it has been the practice at the Royal Victoria Hospital to have all cases for tonsillectomy and adenoidectomy admitted to the hospital 24 hours prior to operation in order that a thorough physical examination can be carried out. Following operation all children are kept in hospital for at least 48 hours, and adults for at least 72 hours. They are only then discharged, providing the local and general condition is quite satisfactory. Cases from out-of-town are informed before treatment is begun, that they must make arrangements to stay in the city for at least nine days after operation, and they are asked to report for examination just before departure.

The follow-up of the patients after they leave hospital is very thoroughly and efficiently attended to by the Social Service Department of the hospital. When an out-door case is discharged from the ward the patient is given by the social service worker a slip of paper asking him to return to the out-door clinic on certain dates, and a copy of the slip given is filed for reference on those dates. Should they not return or telephone on those dates, a social service worker pays a visit to the home. By this very careful system we find that during the past year, 1926, all but 48 of our cases have returned to the clinic for examination, and of this 48 all have been satisfactorily accounted for by the Social Service Department. Included in this series are the private cases of the staff members. The stay in hospital is not less than that described for the public service, but the follow-up is carried out of course by the individual under whose care the case is. With this close supervision of the cases, both in the hospital and after discharge, the statistics given in this paper would appear to be reliable, and accurately represent the work of a large clinic so that conclusions may be safely drawn therefrom.

The Technique Employed

General ether anæsthesia is used for all tonsil cases unless there is something in the general condition of the patient to contra-indicate it, or unless local anæsthesia is particularly requested by the patient. Gas induction and the intra-tracheal administration of ether is the method of choice for adults.

During the year 1926 there were 1,416 tonsil and adenoid operations performed in the Royal Victoria Hospital. In the majority of cases (89 per cent) the dissection and snare method of operation was used, subject to slight variations by the individual operators. Severe post-operative bleeding occurred in 0.7 per cent of the cases. The guillotine method of operation was used in 11 per cent and was followed by severe post-operative bleeding in 2.6 per cent. For the removal of the adenoid tissue the Laforce adenotome is first employed and followed by the adenoid curettes. Bleeding occurred from the adenoid bed in six cases, or 0.4 per cent. No matter what method of operation is chosen, in every case, both in children as well as adults, all bleeding points in the ton-

sillar fossæ are secured and ligated before the adenoid is removed.

On the stretcher the patient is kept on his side and when returned to bed is placed well over in the lateral position so that in the case of hæmorrhage, any blood will run out of the mouth rather than down the throat. Moreover the breathing is more free in this lateral position. An ice collar is placed about the neck and is retained for the first 24 hours. Cracked ice may be sucked for the first few hours, then later a mouth wash or throat irrigation is allowed, but the patient is asked not to gargle the throat. The throat irrigation simply consists of a cleansing solution, which is placed in a douche can, and held about a foot above the patient's head. The patient himself controls the flow and nozzle, allowing the solution to flush out the mouth. It is very soothing when the patient is instructed to use it properly. If the patient is very restless or if there is any sign of fresh bleeding, the children are given compound tincture of camphor, and adults morphine. After this, if there is still any sign of bleeding, the case is examined and carefully watched but the morphine is not repeated owing to the danger of the patient becoming rather comatosed, when blood may run into the trachea even to the point of asphyxia, before much evidence is shown. This is a very real danger. In suspicious cases all vomited blood is kept for the inspection of the surgeon on duty. If the vomiting of bright blood persists and on inspection free bleeding is seen to come from either tonsillar fossa or from the adenoid region, the case is immediately returned to the operating room. The Royal Victoria Hospital is particularly fortunate in that, the wards, the operating rooms, and the out-door clinic rooms of the Otolaryngological Department are all together on the same floor. When there is severe bleeding the condition can be dealt with much more efficiently and safely in the operating room. A general anæsthetic is given and the throat is examined. If the bleeding is from either tonsillar fossa the bleeding point is clamped and ligated. If from the naso-pharynx a post-nasal plug is inserted which is never left in place more than 24 hours and preferably not more than 18 hours. In the majority of cases these patients make an uneventful recovery, but they are always kept in hospital for several extra days under careful observation for any complication which might arise. If the bleeding has been severe, a glucose saline is given by rectum, subcutaneously, or intravenously, depending upon the urgency of the case. Very rarely is a blood transfusion necessary.

Post-Operative Hæmorrhage

The cases have been classified according to whether the post-operative bleeding was primary or secondary.

Primary post-operative bleeding occurs within the first 24 or 36 hours after operation. A vessel may have escaped being ligated at operation, or else a ligature may have slipped. Again the subsequent vomiting and clearing of the throat may have removed a clot from a vessel. In this series there were five cases of primary post-operative hæmorrhage, 0.3 per cent of the total number of operations. In the latest case the bleeding occurred within six hours after operation. In all five cases the bleeding was from one or other tonsillar fossæ, and in every case the bleeding point required ligation. Two of these cases had been operated upon by the guillotine method, the other three having been done by the dissection and snare method. There was no primary hæmorrhage from the adenoid bed.

Secondary post-operative bleeding may occur from the third to the tenth day after operation, and is probably due to too early separation of the slough covering the surface of the wound either from infection or from injury. Owing to the infiltrated and soft condition of the tissues arrest of the hæmorrhage is more difficult as a ligature will very easily tear through the vessel. During the past year there have been fifteen cases of definite secondary hæmorrhage, 1.4 per cent of the total number of operations. In this series the bleeding occurred on the fourth day in two cases, on the fifth day in three cases, on the sixth day in four cases, on the seventh day in three cases, and on the eighth, ninth, and tenth days there was one case each. It is seen that twelve, or 80 per cent of these cases occurred within the first seven days following operation. If the out-of-town patients remain in the city for seven to nine days there would seem to be little danger of hæmorrhage after that time, providing the train journey is not too

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long and fatiguing. Of the fifteen cases of hæmorrhage all but two had been discharged from hospital. In nine of these cases of secondary hæmorrhage the bleeding was from one or other tonsillar fossa, 0.6 per cent of the total number of operations. Two had been operated upon by the guillotine method, neither requiring ligation. The seven other cases were operated upon by the dissection and snare method, and four required ligation of the bleeding point. In six of the cases of secondary hæmorrhage the bleeding was from the adenoid bed, 0.4 per cent of the total number of operations. Two required post-nasal packing to stop the bleeding. The remaining cases yielded to the more conservative method of removing large clots from the naso-pharynx: keeping the patient quiet, putting ice compresses over the nose, and instilling hydrogen peroxide and adrenaline into the nose.

There has been one death from secondary hæmorrhage following tonsillectomy in which the bleeding began on the eighth day. A boy of eight years of age. The general physical examination before operation was negative. The clotting time was not done. The tonsils were removed by the dissection and snare method of operation. There was the usual amount of bleeding at the time of operation requiring two ligatures in the right and one in the left fossa. The child was discharged from hospital 48 hours after operation, apparently in good condition. On the morning of the eighth day the child spat up some blood, and the mother returned with him to the hospital. After examination he was taken to the operating room and under general anæsthesia a bleeding vessel in the right fossa was ligated. This stopped the bleeding. The child was returned to the ward. Glucose salines were given every four hours by rectum. Thirty-six hours later the child was examined by one of the senior attending staff and the throat was in good condition. One hour later he vomited a large quantity of more or less bright blood. Examination revealed no definite bleeding point. One hour later the child again vomited a large quantity of blood and this time the bleeding was seen to be from the right tonsillar fossa. He was returned to the operating room and under general ether anæsthesia, the clots were removed from the right tonsillar fossa. There was a general ooze from the fossa. The tissue was very soft and sloughy . Before any definite bleeding point could be secured the child became pulseless. Resuscitative measures revived the heart for a few minutes but he died, presumably from loss of blood. An autopsy was not allowed.

Conclusions

1. In this series of 1,416 cases of tonsillectomy and adenoidectomy secondary post-operative hæmorrhage was more common that primary post-operative hæmorrhage.

2. Post-operative hæmorrhage, both primary and secondary, were more common following the guillotine method of tonsillectomy than following the dissection and snare method of operation.

3. There was no primary post-operative bleeding from the adenoid bed. Every case of bleeding from the adenoid bed was one of definite secondary hæmorrhage.

4. All cases of primary post-operative hæmorrhage occurred within the first six hours after operation. Eighty per cent of the cases of secondary post-operative hæmorrhage occurred within the first seven days after operation.

5. Out-of-town cases should be kept in the city at least eight days after operation for re-examination, owing to the danger of secondary hæmorrhage.

A Comparison of the Fatal Accident Rates in the United States and England for the Year 1924.—For the United States there were 76.2 fatal accidents per hundred thousand population, while in England and Wales during the same year the death rate of accidents was only 34.1 per hundred thousand population. In Scotland it was 45.2 and in Australia 48 for the same year. According to the National Safety Council the New Zealand rate for 1923 was 46.1 and Canada 56.5; Belgium in 1922 had a fatal accident rate of 28.3 and Norway a rate of 39.6. These differences between the accident death rates of this country and the rates of other civilized countries are shocking, and should stimulate greater efforts at accident prevention.—*Am. Med.*, Jan., 1927.

A CASE OF SNAPPING HIP WITH OPERATIVE CURE

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CERTAIN individuals have the power of producing a snap, audible as well as palpable, in the region of the hip joint. Probably many more could do so if they practised it, for the production of the snap at the hip is largely a trick caused by putting the hip in a certain position and making certain movements. In most instances no pain accompanies the snap, in others pain gradually or suddenly appears and there is real disability. It is difficult to accurately determine the latter as the condition is often exploited. In war time a snapping hip was often made use of to keep its possessor from the firing line. For this reason a psychic element is at times invoked as a cause of the snap.

Perrin is said to have been the first to demonstrate this condition in Paris in 1859. It was for some time thought to be due to a voluntary dislocation of the hip joint itself, or to an irregularity in this articulation. Such cases are no doubt possible but seem to be extremely rare. They are not to be considered in this paper.

It was finally demonstrated that the snap arose in the neighbourhood of the great trochanter and was due to some structure being stretched by this prominence and then suddenly released. The great trochanter itself has never been found enlarged or rough enough to cause trouble, and the bursæ on it do not seem capable of causing anything but pain and tenderness.

What causes the snap? A few months ago a very illuminating instance of snapping hip was referred to the writer by Dr. C. T. Lundon, then of Canterbury, New Brunswick, now of Montreal. The patient was a young girl of 17, complaining of pain in the right hip, and a snapping sound in the hip caused by movement. Her history was that certain movements of the right hip had always produced a snapping sound since infancy, but without pain. In February, 1926, a stool on which she was sitting gave way suddenly, a strong muscular effort was made to prevent falling, the hip snapped and pain immediately ensued. Pain was now invariably produced by the snapping of the hip and even without snapping the posterior border of the great trochanter remained tender to the touch. Turning the thigh inwards and slightly flexing the hip would produce the snap. Usually the patient was able, with the production of a reverse snap, also painful, to resume her normally relaxed position in bed. On several occasions, however, an anæsthetic was necessary to permit the hip to snap back into a comfortable position. A plaster of Paris spica had been tried without relief. Turning in bed, flexing the hip and attempts at walking, all produced painful snapping. The patient was badly crippled.

Her history indicated that this same hip had been since childhood abnormally free in its range of movement, so much so that she could easily kick her own head either front or back. Her father and one other sister had similar acrobatic powers. There was also a history of general joint swelling and pain every winter since the age of 11. Her heart was of average size and there were no murmurs; her tonsils were infected. X-rays of her hip revealed nothing abnormal. Palpation of the hip revealed a sudden and audible movement at the great trochanter associated with internal rotation and flexion of the right thigh. Something seemed to jump suddenly forward from behind the great trochanter. By another twist of the hip the movement was reversed and the structure returned to its apparently normal position back of the great trochanter. Here tenderness was constantly present. No relaxation nor undue mobility of the hip joint proper was detected. Some tight structure was evidently caught on the great trochanter and snapped from behind forward and back again.

At operation the great trochanter was exposed by separating the fibres of the gluteus

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maximus. Nothing abnormal was found posterior to the great trochanter nor upon it. The bursa under the gluteus maximus was normal and there appeared to be nothing wrong with the hip joint itself. The front margin of the gluteus maximus became merged into the deep fascia of the thigh and it was noticed that these structures as they united were very tightly stretched over the surface of the great trochanter. A finger could not be inserted between the fascia lata and trochanter even with the patient under ether. On exploring forward a very thick band of fibrous tissue, thought to be unusually thick fascia lata (ilio-tibial band) was discovered immediately in front of the great trochanter. (The hip was flexed at the time). This band was about ⅛ inch thick, the width of a finger in breadth and appeared to run from above downward from the region of the iliac crest towards the knee. It seemed to lie between the gluteus maximus behind and the tensor fasciæ femoris in front. On being cut transversely it retracted ¾ inch. The divided ends were sutured to the great trochanter, above and below, and a plaster of Paris spica applied to remain six weeks. A prompt cure was found to result. The questions of interest in this case are: what was the band and how did it cause a snap? Most of those who have written on the subject consider the band to be an abnormally thickened portion of the fascia lata (ilio-tibial band of fascia lata) lying between the tensor fasciæ femoris in front and the gluteus maximus behind, receiving an insertion from either muscle. The fascia lata in this region normally runs from the iliac crest down the thigh to the tibia.

The thickened band, it is thought, is congenital in its origin, running normally downwards just back of the great trochanter, and receiving normally no interference from this prominence.

On internally rotating the thigh and slightly flexing the hip the great trochanter becomes more prominent. The thickened band is stretched over this until in those cases in which it is unusually thick and tight, it snaps forward like a bow string suddenly released.

The trauma of sudden and repeated muscular effort finally loosens and probably thickens the band and it develops a greater range of movement. Over the trochanter pain and tenderness become a feature. Some of the reported cases, as also the one here cited, give the history of an arthritis in childhood, probably acute articular rheumatism. This may tend to cause inflammatory thickening in the fascia. Trauma, however, seems a more likely cause engrafted on a congenitally thickened band. F. Wood Jones[1] of London on the other hand states positively that the structure causing the snap is not fascia but the tendon developing on the deep surface of the gluteus maximus, which constitutes the normal insertion of the muscle into the gluteal ridge of the femur. In his two cases this tendon was unusually developed. It is questionable however, whether his cases (soldiers) had real disability.

Leo Mayer[2] of New York describes an apparatus to keep the thickened band in its place back of the great trochanter. This has proved successful at times, not only in stopping the snap while worn, but in causing it to disappear permanently.

Verth is said to have been the first to call attention to a normal thickening of the fascia lata running longitudinally downwards from the iliac crest to tibia.

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DERMATITIS VENENATA IN THE RUBBER TIRE INDUSTRY

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THE field of industrial dermatoses is an ever-widening one, and the increasing use in newer manufacturing processes of new and complex chemical bodies is an important factor in this growth. Contact with some of these compounds produces in many instances skin affections with distinct and characteristic appearances and symptoms. A well-known example is dermatitis occurring in the fur industry and in wearers of dyed furs from para-phenylamine-diamine. In most cases these dermatitides produce more or less disability, and it is of importance that the cause be determined as early as possible, so that not only may the workman be returned to his occupation, but that appropriate prophylactic measures may be instituted. For these reasons it is believed that publication of the following case with comments is justified.

M. A. M., aged 37, an employee in a rubber tire factory reported August 28, 1925, complaining of an itching eruption on both hands and forearms. It had commenced 5 to 6 weeks previously, and there had been previous attacks but none so severe as the present one. The eruption commenced with the appearance of vesicles upon the palmar surface of the fingers, which developed rapidly, ruptured and discharged a clear serum. Desquamation followed, and the area spread by development at the margins of fresh crops of vesicles. The lateral margins and dorsum of the fingers, the dorsum of the hand, and finally the forearm became involved. The palm escaped. Itching at points where crops of vesicles were appearing, and subsequent soreness and stiffness, were complained of. There was no moisture after the disappearance of that escaping from ruptured vesicles, all areas drying quickly. The patient related that the chemical with which he came in contact most constantly was hexa-nitro-diphenylamine, and to a very much less extent he handled some other phenylamine compounds. Examination showed a dry desquamative condition of the skin of the palmar surface and lateral margins of the fingers. There was a moderate amount of fissuring at the flexures. The skin of the dorsum of the fingers and hands and all surfaces of the arms was moderately infiltrated, dry, red and slightly scaling. At its borders on the forearm it became patchy and the margin was polycyclic. The treatment consisted in the use of a lotion of liquor carbonis detergens, tr. benzoin and phenol and later a protective ointment containing zinc oxide, oleic acid and ammoniated mercury, adapted from formulæ given by Prosser White.[1] Relief from the irritation and soreness followed very promptly. At the end of six weeks and after two fractional doses of x-ray, the hands appeared practically normal and there was no irritation. There has been no recurrence since but the patient has been directed to employ a neutral fat inunction as a prophylactic when working, and to resort to the ointment at any time when there is a suggestion of recurrence.

It should be added that the use of x-ray in such cases is of doubtful value as stated by McKee[2] but it is occasionally found, as McKee further states, that it is a useful aid in shortening the period of itching and appears to hasten the involution of the lesions. Such effects were obtained in this case.

I do not find hexa-nitro-diphenylamine mentioned in the literature as a source of harm to workers in the rubber industry. Benzol is the chemical most commonly mentioned as a cause of dermatitis in rubber workers. Benzol was used where the patient worked, but this is a liquid and for its effects to be produced the hands must be in daily contact with benzol. Hexa-nitro-diphenylamine (known colloquially in the factory as "hex") is a powder, readily conveyed through the air, and therefore might be expected to produce its effects on the face and parts covered by dusty sweat-soaked clothing. The patient was unaffected on parts of the body other than as mentioned.

Mention of hexa-nitro-diphenylamine is most frequently made in connection with tri-nitro-toluene (T.N.T.) and the effects of bombs dropped during air-raids. Sequeira[3] states that it was combined with T.N.T. in bombs dropped in London, and he observed numerous cases of those who come in contact with the powder from broken unexploded bombs. The eruption was an acute vesicular dermatitis in some cases leading to extensive foliation and protracted inflammation. MacLeod[4] makes a similar reference. Prosser White[5] refers to its effects following air-raids, and also to its use in dye industry for colouring cheap shoes and other goods yellow, where it is known as Aurantia or Emperor's Yellow. The eruption is the same as that described by the other authors. His formulæ, prescribed for workers in T.N.T. factories were modified for use in the present case.

Cole and Driver[6] speak of employees in rubber plants working with poisonous aniline

derivatives which are decomposition products of hexa-methylene-tetramine, although they do not mention hexa-nitro-diphenylamine specifically. Shepard and Krall[7] state that repeated contact with rubber stock containing hexamethylene-tetramine gave rise to a vesicular dermatitis. Their theory as to its action is that the chemical is changed into formaldehyde by the slightly acid reaction of the sweat, and this is later changed in the pores to formic acid. It may be assumed that the same mechanism and reactions obtained in the present case.

There are many compounds closely related to hexa-nitro-diphenylamine used in the rubber industry as "organic accelerators" in the vulcanization processes, which groups include both hexo-nitro-diphenylamine and hexa-methylene-tetramine. The symptoms of poisoning by the former observed after contact with the contents of T.N.T. bombs, *viz.*, a vesicular dermatitis of hands and fingers followed by exfoliation and accompanied by infiltration, fissuring, etc., are those observed in the case reported. The patient related that in the factory where he worked and in others in which he had previously been employed, "hex" is the principal compound used as an accelerator.

Summary

Hexa-nitro-diphenylamine, a compound in common use in the rubber industry may produce a dermatitis with characteristic features, and thereby lead to considerable disability. The treatment as recommended by Prosser White is simple of application and eminently successful, and prophylaxis appears to be practicable.

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Health Surveys by the Milbank Memorial Fund.—The directors of the Milbank Memorial Fund of New York have set out deliberately to increase the life span of the residents in three typical districts of New York state. They have determined to enlist the co-operation of the best professional experts and to make demonstrations of what can now be done to reduce sickness and to extend the period of healthy life in the average American community. Work has been under way for more than three years in Cattaraugus County and in Syracuse, two of the centres selected for the New York health demonstration. One of these districts is typically rural; the other a medium-sized city. Inauguration of the third enterprise in the Bellevue and Yorkville neighbourhoods of New York City was announced about a year ago. This district is bounded by Fourteenth and Sixty-fourth Streets, the East River and Fourth Avenue. From Forty-second to Fifty-ninth Streets it extends as far west as Sixth Avenue. This means that it has within it the large slice of fashionable New York that centers around Park Avenue and the fifties, as well as some very poor districts, and some that are peopled by the merely comfortable social groups. Its population is 214,000. Each of the experiments is conducted under the auspices of the local health officers, and in accordance with the laws and rules and regulations of the New York State Health Department, and of each locality. What the fund does is to afford expert consultants, and temporarily to provide the money for services which would otherwise not be obtainable in the locality.

As late as the 19th century the lay mind in England was not free from the idea that epidemic disease was a visitation of God. The preamble of the following act shows this.

An Act for the Prevention, as far as possible, of the disease called the Cholera, or Spasmodic or Indian Cholera, in England. (20th Feb., 1832).

Whereas it has pleased Almighty God to visit the United Kingdom with the Disease called the Cholera, or Spasmodic or Indian Cholera: And whereas, with a view to prevent, as far as may be possible, by the Divine Blessing, the spreading of the said Disease, it may be necessary that Rules and Regulations should from Time to Time be established within Cities, Towns or Districts, affected with or which may be threatened by the said Disease; but it may be impossible to establish such rules and regulations by the Authority of Parliament with sufficient Promptitude to meet the Exigency of any such case as it may occur: Be it therefore enacted, etc., etc.

Jamieson

HEREDITARY ABNORMALITIES OF THE EYE

IV. Inheritable Diseases Affecting the Conjunctiva*

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FORTUNATELY, the hereditary affections involving the scleral and corneal conjunctiva are relatively few, especially in comparison with the great number of diseases which may destroy the integrity of these structures. According to some authorities diseases of the cornea alone account for at least one-fourth of the cases of blindness. Although some of the inherited defects of the cornea cause blindness, others which come under this category are not serious in their results.

Blue Sclerotics

The name given to the condition of the eyes, in which the sclera is thin, translucent and bluish in colour, is merely a sign of a much more complex disorder than its name implies. The underlying basis of the syndrome is a widespread failure in the development of the connective tissues in general,[11] and the peculiar appearance in the eyes is due to defective development in the scleral coat which is only one-third its normal thickness. Nor is this eye defect the most important component of the picture, although the one most constantly present. The marked fragility of the bones arising through the imperfect deposition of their organic matrix, causes them to snap with far greater ease than is normal, with the result that an undue number of fractures, sometimes amounting to fifty or sixty, may occur in the lifetime of patients exhibiting this condition.

This defect should be distinguished from that known as osteogenesis imperfecta, which generally makes its appearance either before or at birth, so that the child may be born with many fractures and usually succumbs. In the case of the person with blue sclerotics, the brittleness of the bones may not manifest itself for ten or twelve years, the fractures usually unite readily but with less callus formation than is normal; and the disease is not in itself fatal, although it is capable of causing many deformities due to poor union.

Although the blue scleræ are always evident in the patient who has the defect, the liability to fracture depends somewhat upon the type of activity in which the patient indulges, so that it is possible to inherit the condition without exhibiting an undue number of broken bones. In a family reported by Blegvad,[4] the defect ran through three generations, being associated with the fragility of bones already mentioned, also with deafness, although not all three conditions necessarily appeared in any one individual. The grandfather who showed only blue scleræ had three daughters in whom the eye defect, bone defect and deafness appeared; another daughter who had only blue scleræ, another who showed only deafness, and three who were normal. Of his 11 grandchildren who were born to two of the daughters showing all three defects, five showed blue scleræ and fractures, and six were normal. One normal daughter who married had one normal son.

Numerous pedigrees have been reported showing this affection existing through two,[3, 11, 24, 26] three,[4, 7] four,[1, 5, 7, 8, 16] and five generations.[7] The family history recorded by Burrows,[5] (Fig. 9) gives practically all the essentials in the inheritance of this disorder. It is not transmitted by those who are not afflicted with it; it appears in males and females alike; it is transmitted by mothers to sons and daughters, and it is transmitted by fathers to sons. In the pedigree of Blegvad,[4] the other essential is met with, and that is fathers transmit it to

* Part I, Laws of heredity and their exemplification in the inheritance of eye colour, *Canad. M. Ass. J.*, Nov., 1926, xvi, 1340. Part II, Inheritable defects involving the eyelids and their mode of transmission, *Ibid.*, Jan., 1927, xvii, 55. Part III, Anomalies of the entire eyeball, *Ibid.*, Mar., 1927, xvii, 327; April, 1927, xvii, 421.

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daughters. We can conclude then that this defect is not sex-linked, that is, it is not carried in the sex chromosome, as we found that microphthalmus sometimes is.[19] Because it is not transmitted by those who do not show it, we can conclude that it is not recessive in character, as is blue eye colour, but is a dominant character comparable to brown eye colour. (See Table 1[20]).

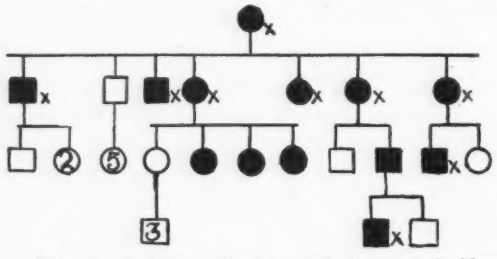

FIG. 9.—Pedigree showing inheritance of blue sclerotics and fragile bones. Squares indicate males; circles, females. Black symbols indicate blue scleræ; X indicates fragile bones. Clear symbols indicate unaffected members; those with a number in, show a corresponding number of unaffected persons. (After Burrows.)

In Fig. 9, all the affected members were hybrids, for they all had one normal parent, and some of their offspring were normal. Hence all these matings are comparable to mating V, Table 1.[20] We note too in this family that the presence of fractures was not an invariable accompaniment of the eye defect, but depended probably upon the conditions of life which the patient met. That a person may have blue scleræ without the fractures, yet pass on to a child the imperfect development of connective tissue which results in the presence of both eye condition and fractures, is illustrated by the male in the third generation, whose mother and son showed both blue scleræ and fractures while he himself had only the former.

As far as the eye defect is concerned, this malformation is of minor importance, but the great tendency to fractures and resulting deformities should be explained to the patient. The suffering to which he will subject his children should they inherit the condition, as they have an even chance of doing, and the financial burden of frequent doctor and hospital bills for his children to which he subjects himself, may be a sufficient deterrent, so that he will realize the inadvisability of reproducing his condition.

PTERYGIUM

An affection said to occur more frequently in persons exposed to wind, sun and dust, such as farmers, appears to be an inherited condition in some families, although not in all. Armaignac[2] cites the history of a family in which pterygium had affected eight people in three generations (Fig. 10). It had always

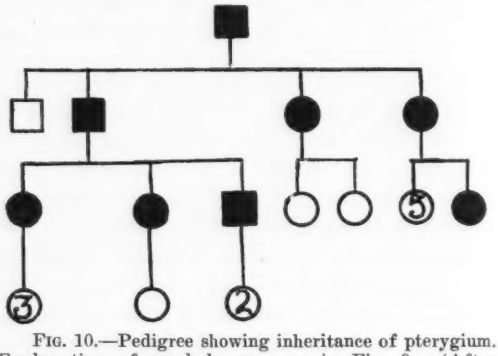

FIG. 10.—Pedigree showing inheritance of pterygium. Explanation of symbols same as in Fig. 9. (After Armaignac.)

acted as a single dominant character, such as the brown eye colour, being passed on from parent to child and not skipping a generation. It affected males and females and was transmitted by both to members of either sex.

The most extensive record of the inheritance of this condition which I have been able to find is that reported by Newman[22] in a family which suffered from night blindness as well as from pterygium (Fig. 11). Although the

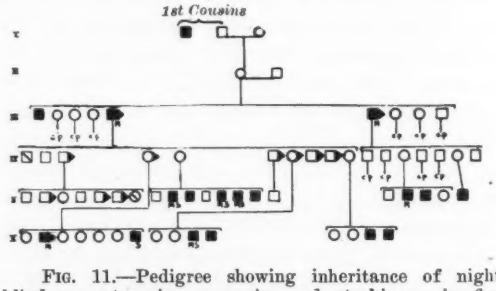

FIG. 11.—Pedigree showing inheritance of night blindness, pterygium, myopia, and strabismus in five generations. Black symbols indicate night blindness; black triangles to right of symbol indicate pterygium; M, means myopia; S, strabismus; c.p. means clear progeny; \ means died in infancy. Note that night blindness is here transmitted through an unaffected mother to some of her sons, who show the condition. Pterygium is transmitted as a dominant character to both sexes. (After Newman.)

record extends over five generation as far as the night blindness is concerned, there is a

history of pterygium only through the last three. This may easily have been because the defect was not so serious as to cause the younger generations to remember it in their forefathers as they would the presence of the rare condition of blindness at night.

This pedigree is of unusual interest for it shows the inheritance of two characters in the one family, the two being carried in different chromosomes. The factor for night blindness in this family is linked with sex in the sex chromosome, and hence we find it being carried by unaffected mothers and passed on as an evident defect to their sons. (See Table 2, Mating IX[19]). The factor for pterygium is not linked with sex, and hence is shown by both men and women in the pedigree. Since the two qualities are not present in the same chromosome, we may find individuals who have inherited neither of the defects, those who have inherited both, and those who have inherited either the one or other but not both. Thus we find three males who have received both defects; fifteen males who have inherited night blindness, but not pterygium, and seven males and two females who have inherited pterygium but not night blindness. The remaining group are those who are either actually clear of these defects, or who are carriers of the factor for night blindness. If we now ignore those who are night blind, and follow only those affected with pterygium, we see that it appeared first in two males in the third generation, one of whom did not pass on the character to any of his seven children. The other brother however, transmitted it to six of his ten children. Two of these did not marry, two married but did not transmit it, and of the two remaining children, one passed on the defect to one of her seven, the other to three of his seven children.

Thus in this family, as in that reported by Armaignac[2] (Fig. 10), we find pterygium acting as the brown eye colour, (Table 1, Mating V[20]), being dominant to the condition for normal scleræ, and hence showing as an evident character, even when its possessor has received it from only one parent.

The condition in itself is not serious, but may easily become so by progressive growth over the cornea, until the pupillary area is partially or wholly covered, thus causing blindness. It requires operative treatment, and, according to text-books on ophthalmology, may recur. Thus patients who are suffering from pterygium, who give a history of the condition existing in other members of the family should be informed of their ability to transmit the defect to their offspring.

Megalocornea

Which we distinguished from buphthalmus in an earlier paper,[20] is an inherited condition and is sex-linked in its mode of transmission, that is, it is exhibited as the defect by the male and transmitted to him by his unaffected mother. (See Table 2, Mating IX[19]). Clausen[7] mentions the family reported by Gertz, in which two brothers, sons of healthy parents, both exhibited megalocornea. The three sisters were normal, and the descendants of two of them were normal. The two sons of the third sister, however, showed the defect as their two uncles had done. Their mother was thus a carrier of the defect. (See Mating IX[19]).

A most extensive pedigree of this condition was collected by Kayser.[17] In five generations of this family seventeen males were affected; the females never showed the disease. The one male in the second generation who was affected appeared to inherit his father's defect, but knowing the rules that govern the transmission of sex-linked characters, we can safely say that his mother was a carrier, and that it was from her that he received the factor for megalocornea. There are in the chart thirteen males whose mothers were from normal stock, and whose fathers showed the defect, and since none of them inherited it from their male parent, the assumption is justified that in the case of the male in the second generation the inheritance was according to rule, that is, from the

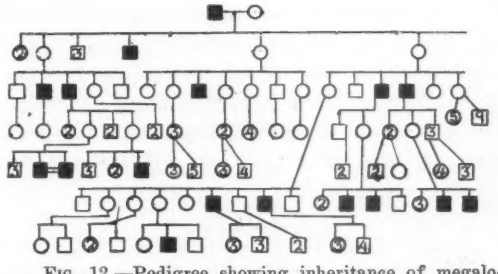

Fig. 12.—Pedigree showing inheritance of megalocornea. Note that only males are affected, and that the transmission is through unaffected mothers. (After Kayser.)

unaffected mother and not from the affected father.

Megalocornea is a rare condition, Clausen[7] stating that in 1919 Kestenbaum had collected only 44 cases from the literature. Stæhli[25] records two cases which follow the sex-linked mode of inheritance, a man and his sister's son both showing the defect.

Grönholm (cited by Clausen[7]) gives a very interesting pedigree of this condition, because in it there are two females affected, as well as eleven males. The males in each instance had mothers who belonged to the affected stock and hence were carriers (Mating IX, Table 2[19]), so that the transmission was according to rule. In the case of the two affected females who were sisters, the transmission was again according to rule, only it is seldom that we see females affected with sex-linked diseases. They were the offspring of a union such as is illustrated in Mating X, in which the father had the disease and the mother was a carrier. Their parents were first cousins; the father had megalocornea, and the mother was the daughter of a man who had megalocornea. She therefore had to be a carrier of the defect. As we recall from Table 2, Mating VIII,[19] all daughters of a man suffering from a sex-linked recessive disease must of necessity be carriers of that condition, although not showing it. Hence their mother carried the factor for the disease as well as their father. Inheriting the defective chromosomes from both parents, the daughters exhibited a defect which is commonly shown only in the male.

A recent article has appeared in which a family pedigree was reported, showing megalocornea being transmitted as a pure dominant.[13]

The condition is not injurious to vision, nor is it progressive according to Clausen; so that apart from the unusual aspect of the patient's eyes, there is nothing of eugenic significance in megalocornea. Should patients inquire concerning their ability to transmit it, the manner of inheritance should be explained to them, but according to our present knowledge, no warning against rearing of children is indicated.

Microcornea

The opposite condition to the one just described, has been reported associated as a rule with other ocular defects. The number of pedigrees however, is small, so that it is rather difficult to determine just what the mode of inheritance is. Clausen[7] quotes various authors as having seen it in mother and daughter, father and daughter, in the children of two healthy sisters, and in one family through three generations.

Keratoconus

Which fortunately seems to be rather rare, has been reported as occurring in families, in which the parents were healthy, in other cases descending through two or three generations. Van der Hoeve[16] records a family in which a woman passed it on to her son, and he marrying his first cousin, passed it on to one son and two daughters. The number of records is very limited, but on the whole Clausen[7] feels that it may be caused either by a recessive factor, or by factors carried in several chromosomes. Due to the marked deformity of the cornea which materially interferes with vision, and may result in blindness, persons suffering from this type of ocular defect, should refrain from reproducing.

Embryotoxon

Or arcus juvenilis, is also definitely inherited in some families. It is a congenital opacity of the corneal margin sharply delimited both centrally and peripherally according to some authors. It does not interfere with vision. Stephenson (quoted by Clausen[7]) cites the history of a family where this anomaly had run through four generations, acting as a dominant character for the most part, affecting twenty-one out of thirty-two members. It affected both sexes.

Corneal Opacities

May be of several varieties according to their shape, and most of them are due to congenital syphilis, although some have been recorded as being due to the acquired disease. Some cases are considered as due to tuberculosis. Hence in examining families in which corneal opacities occur, these two causes at least must be excluded, before the cases can be listed as due to inherited tissue defects. It is quite obvious that either congenital syphilis or tuberculosis would be as apt to affect several members of a family, or parents and children,

as if the disease were actually passed on in the germ cells.

Chance[6] found reticular opacities of the cornea in a father and son, with marked decrease of vision. There was no other evidence of tuberculosis or syphilis and the Wassermann was negative. Roy[23] records the presence of nodular opacities in a mother and five children, in all of whom the same refractive error occurred. He found no evidence of tuberculosis, and treatment directed to that end met with no result. He mentions nothing about the possibility of syphilis. Hine[15] reports opacities in a mother, son and daughter; Hancock[14] in a child, his mother and her father, with no evidence of syphilis in any of the three; Groenouw[7] describes nodular opacities in the cornea in a man, three of his eight children, and in one of his grandchildren.

A record showing the presence of corneal opacities in children of healthy parents is published by Collins,[9] who found them in two of three children of healthy parents, but he suggests that there is a possibility of gonococcal infection. Dawnay[10] found them in two of a family of fourteen children, of whom he was able to examine only five. Moxon[21] found them in two sisters, children of first cousins, and there was no sign of congenital syphilis. The cases reported by McNab[18] were of three children in one family. The mother in this family had had three miscarriages, and three stillbirths; three children had died in early infancy, cause unknown, one had died at birth; and of the remaining six children, four showed corneal opacities. Although he says there were no signs of congenital syphilis, the history is so strongly suggestive of it, that I feel such instances can be safely ruled out of the category of inherited cases.

Tritscheller[7] had the interesting experience of treating four different families with corneal opacities, two members in two generations being affected in one family; four members in two generations in the second family; five members in two generations in the third, and five members in three generations in the fourth. None of the families knew of their connection with the other three, but when Tritscheller began to compile their family tree, and to investigate birth records, he found that all four families were descended from a common ancestor five generations back from the oldest patients in two of his families, and four generations back from the oldest patients in the other two. The explanation of the sudden appearance in the four families lies probably not in the fact that the disease was just coming into existence in the family, but that the older generations had found their vision sufficiently good for the much less exacting demands of nearly two centuries ago, and that the knowledge or memory of the defective vision of their forebears had been lost to the younger generations.

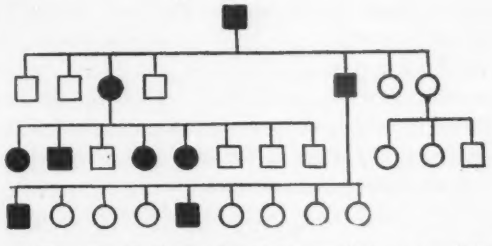

FIG. 13.—Pedigree showing transmission of nodular opacities of the cornea. No evidences of tuberculosis or congenital syphilis in any of the family. Transmission agrees with theory that this is due to a dominant factor. (After Folker.)

In Fig. 13 is given the pedigree compiled by Folker,[12] of nodular opacities of the cornea in three generations. We find that in this family fathers and mothers transmitted it to both sons and daughters, that it was not passed on by the one unaffected person who married, and that it did not skip a generation. In other words, it agrees with the rules for the transmission of a simple dominant character such as the brown eye colour, and we find that these matings are comparable to Mating V,[20] where a person pure for the recessive character, in this case normal eyes, was mated to one who was a hybrid for the defect, having one factor for normality recessive. The mating of the one normal person in the pedigree would of course correspond to Mating IV,[20] where two people pure for the recessive character (normality) mate and can have only children like themselves.

In those families in which the transmission corresponds to that of a recessive character, it may be that they were exhibiting, not the hereditary, but the syphilitic type of opacity. It may be that in this condition, as in microphthalmus, one type of transmission holds in

one family. the other in another. No matter what the underlying cause of the condition, whether it be congenital syphilis or heredity, the persons afflicted with corneal opacities should not marry.

In summing up the diseases which affect the conjunctiva and arranging them in order of importance, it may be said that megalocornea and embryotoxon are not injurious to the patient. Pterygium, microcornea and blue sclerotics may be harmful, the first two through abnormalities caused to the eye, the latter through deformities of the bones. Keratoconus and corneal opacities are definitely harmful, causing partial or total blindness, and individuals suffering from these conditions should refrain from reproducing. This applies to those in whom the corneal opacity is due to congenital syphilis as well as to those in whom it is an inherited tissue defect.

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E.107.—At a recent meeting of the Berlin Medical Association, described in the *Manchester Guardian* for March 25th, clinical reports were presented on the action of a new anæsthetic which has been invented by chemists of the German Dyestuffs Federation. This compound, whose nature is not divulged, is called E.107, and has been tried by seven independent observers in some hundreds of cases. A small quantity is passed into the rectum in a clyster while the patient remains in bed in the ward, and within seven or eight minutes he is ready for operation; he is sufficiently relaxed, breathing is as quiet as in sleep, and the induction has been accomplished without causing nervousness, struggling, or undesirable reflex actions. According to the reported claims, recovery from the effects of administration is unattended by vomiting or any untoward symptom, and the new anæsthetic is regarded as suitable both for the old and feeble; it has been tried successfully for the production of twilight sleep. Were nothing else recorded, it might appear that E.107 is an almost ideal means of producing anæsthesia, but unfortunately it caused in some patients a certain amount of intestinal irritation, whilst in others cyanosis supervened and artificial respiration became necessary. Prof. Unger, however, in his whole series of 300 cases, is said to have noted no irritation of the intestine, a fact which he attributes to having made sure that the samples of the drug had not deteriorated before they were given. And it is suggested that respiratory depression only occurs in a certain type of patient. From the accounts given in English newspapers it is not clear what type this may be, but the German observers are quoted as saying that it may be detected before induction of anæsthesia, so that no one need be given E.107 who is likely to react to it badly. The uncertainty of absorption from the intestine must be reckoned with, and it has to be remembered that no injection—whether into skin, muscle, vein, or intestine—can give the anæsthetist the constant control of dosage which is possible when administration is by way of the lung. A larger margin of safety is therefore required for drugs not given by the respiratory tract. Given such a margin, however, it is an advantage to avoid the bronchial tubes and alveoli because the chance of post-operative pneumonia is thereby lessened.—*Lancet*, April 2, 1927.

Case Reports

CHRONDROMA OF THE LARYNX

By H. S. Birkett, C. B., M.D., LL.D., and Keith Hutchison, M.D.

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In reporting this case as one of unusual interest, we feel that the small number of these cases on record makes it one of importance.

Irwin Moore of London, Eng., has brought this subject under complete review in an exhaustive monograph published in the *Journal of Laryngology and Otology* of 1925. So complete and satisfactory is this review that we make use of it almost entirely in connection with the description of the clinical and pathological findings of the present case.

Accepting Virchow's classification of 1863, our case must be a chrondroma since it consists of neoplastic cartilaginous tissue, arising from the thyroid cartilage. Bone formation is present, but appears secondary and is not part of the neoplastic process; we therefore judge it to be a chrondroma with ossification rather than an osteo-chrondroma.

After studying Irwin Moore's monograph which includes sixty-two cases in all, gathered from all available sources reported in the literature as far back as the early nineteenth century, (and including Ryland of Birmingham who put three cases on record in 1837), we believe that our case falls into the group that he considers. Furthermore it appears that as our case was clinically recognized as a benign cartilaginous tumour for a period of two years, it should be placed in his end group No. 4, the thyro-fissure cases, in which nine in all were placed, constituting the operative group. Of these, three died of pulmonary complications; there was no recurrence of the tumour in five, while one case is not further reported. Our case brings this group to ten in all, but the unhappy end-result places it in the fatal subgroup of three, now four in all.

However, while pulmonary complications were the immediate cause of death, yet we feel that some circulatory disturbance was an even greater factor; the high pulse rate immediately following the operation, and which did not recover as might have been expected, pointed to some cardiac failure. His sudden collapse within a few hours of death seemed even too rapid for a septic pneumonia, and the autopsy findings were those of a diffuse acute œdema of the lungs rather than of an acute bronchopneumonia; also the clinical examination indicated a capillary bronchitis without any consolidation.

Case Report

The patient, a shop foreman, 49 years old was admitted to the Royal Victoria Hospital on January 21, 1924, complaining of hoarseness and swelling on the left side of the neck.

History.—In November, 1922, he developed hoarseness; this gradually became more noticeable and in the last twelve months definitely worse. There had been no loss of weight during this time; he had a good appetite and slept well. His breathing had troubled him somewhat, but more recently this has improved.

Local Examination of the larynx showed a papilloma, the size of a small pea, near the posterior attachment of the right vocal cord. The left vocal cord did not move, and lay in the mid-position; the arytenoid cartilage was seen to move, indicating that there was no true recurrent nerve paralysis. Below this cord a regular curving medialwards of the lateral wall was seen, covered by an intact mucosa. On the left side of the neck at the level of the thyroid gland there was a small irregular hard mass, about the size of a bean. The general condition was good; the Wassermann was negative in both blood and spinal fluid.

An operation was decided upon and under local anæsthesia, Dr. Birkett, passed a laryngoscope and removed the papilloma from the right vocal cord, no attempt being made to touch the swelling on the left side.

The pathological report on this showed only a papillomatous hyperplasia of squamous epithelium.

Between the end of January, 1924, and January, 1926, he was under regular observa-

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tion by us at fortnightly intervals. The condition in the larynx was seen to be slowly progressive, especially during the last eight months. At times the laryngeal picture has varied somewhat, depending on whether the patient had a cold or not; at such times the mucosa would become engorged and embarrass the breathing considerably. The administration of potassium iodide seemed to help the difficulty in laryngeal respiration. These colds never lasted more than a few days. The gland in the neck resolved in a few weeks and did not reappear after the first operation in January, 1924, thereby helping to rule out malignancy. In January, 1926, a second operation was decided upon, the patient was readmitted to the ward and on January 21st, a laryngotomy was performed under general anæsthesia. An incision was made from the hyoid cartilage to the episternal notch. A tracheotomy tube placed in position at level of third and fourth tracheal rings. The cricoid cartilage, crico-thyroid membrane and thyroid cartilage were divided in the mid-line, using Irwin Moore's instrument, by means of which a very good exposure of the interior of the larynx was secured.

FIG. 1.—Typical low-powered field showing cartilage cells in the matrix and the secondary ossification.

The tumour appeared very distinctly on the left side, covered by intact mucosa and was apparently the size of a small walnut. The mucosa was split by sharp dissection and separated from the tumour by blunt separator; for the most part this mucosa divided easily, although small areas seemed somewhat adherent. The tumour appeared to be of a pinkish colour and of raw-potato consistency as described by Irwin Moore. By careful dissection the tumour mass was removed, as far as could be determined macroscopically. The base of the growth seemed to be entirely in the posterior portion of the left lateral wing of the larynx close to the cricoid and arytenoid cartilages, which did not seem to be involved; no extension of the tumour beyond the larynx was made out. In closing the operation field the mucosal flaps were laid back over the site of the tumour; all packing was removed; no bleeding occurred to any extent, and the wound was dry at the end of the operation; no adrenalin was used at any time during the operation. The external wound was closed by deep sutures placed so as to bring the divided cartilages together. A small iodoform pack was left around the tracheotomy wound and tube. Mechanical suction with a catheter was used to keep the tracheotomy tube clear.

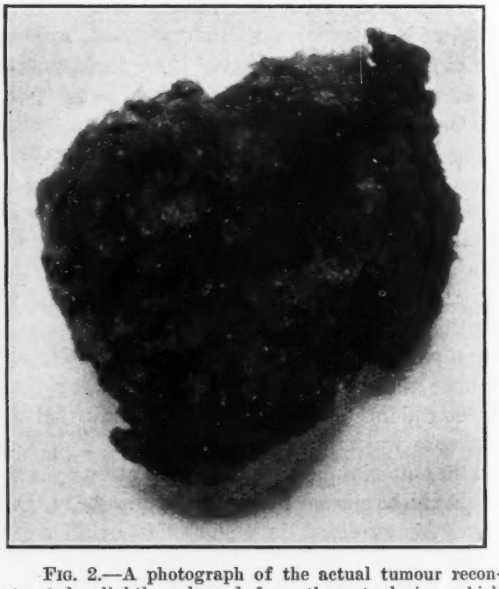

FIG. 2.—A photograph of the actual tumour reconstructed; slightly enlarged from the actual size, which corresponded closely to a fifty cent piece. The x-ray plate showed a clearly defined mass in the region of the thyroid cartilage and over-shadowing this in all directions.

The following day he seemed to be well, and was breathing through his tracheotomy tube quite easily. But later on he developed a temperature of 101° with rapid pulse, and the signs of a diffuse capillary bronchitis de-

veloped which rapidly became severe, and he eventually died 72 hours after operation.

Pathological Report.—Speciment consists of several irregular pieces of firm pinkish tissue, of bony and cartilaginous feeling, which could be reconstructed to form a spherical shaped mass, 3.5 x 3 x 2.5 cm., and weighing 11.5 grammes.

Microscopically, sections of the tissue showed irregular masses of cartilage cells arranged in small nests throughout a diffuse cartilaginous matrix. This matrix was not homogeneous but contained areas of hyaline and mucinous fibrillated material; small irregular areas of calcification, and spicules of bone-formation showing osteoblasts, completed the picture. They appeared, however, secondary to the neoplastic process.

Diagnosis.—Chrondroma showing calcification and bone formation.

PUERPERAL FEVER OR SCARLET FEVER?

An Unusual Case Treated With Antitoxin*

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Mrs. T., aged 36, primipara; normal accouchement; perineal tear, too small for suture. Patient lives on a farm, and had not left home for some time previous to confinement and there had been very few visitors. It seemed therefore possible to exclude all infectious contacts or sources of transmission but one. An "experienced" nurse arrived two hours after the birth of child, from a community eight miles distant, where she had been nursing a family with alleged German measles. There had been sore throat, high fever, fine rash and marked desquamation.

My patient was well for four days, then she became chilly, vomited and complained of backache. In 18 hours a fine rash was noted on the sacral and gluteal regions. This rash spread rapidly and 12 hours later had become intense, scarlatiniform, classical in appearance and in the area of distribution. Lower back, buttocks and inner thighs were almost hæmorrhagic. Her temperature was 104.8°; pulse 108. The tongue was fairly clean, *no sore throat nor pharyngeal redness, nor did any develop at any time during the disease.* Patient had general malaise but complained mostly of headache and pelvic soreness. The lochia was scanty, but there was no unusual odour. The next day the temperature was 105.4°; pulse 115, in spite of the usual febrifuges. She had been delirious during the night and was very toxic. Her hands were swollen and there were pustular bullæ in the palms; the urine was scanty and contained much albumen.

In view of the character and distribution of the rash, she was given 5,000 units scarlet fever streptococcus anti-toxin. (Another time this dose would be larger.)

During the next 24 hours the general improvement was so marked that it was surprising to find her temperature still 104°, and pulse 108. She was much less toxic, the rash was less brilliant and the pustular bullæ had nearly dried up. In another 24 hours the temperature was 100°, pulse 96 and desquamation had begun. She complained of pain in the left lower quadrant, severe when the bowels moved. The tender point was deep and was above and to the left of the fundus. The uterus was mobile and the vaginal fornices clear. The tenderness was high on the posterior abdominal wall and seemed to be in the neighbourhood of the chain of iliac glands draining the vagina and uterus.

Further incidents favoured the diagnosis of scarlet fever. The household had been in practical quarantine since the birth of the child, and in actual quarantine since the onset of the mother's illness, but no efficient isolation was practicable inside the house. Four and one-half days after the onset of the original puerperal fever, a stepdaughter aged 18 and a stepson aged 7 years, who had not been away from home for at least 10 days had a typical onset of scarlet fever, with vomiting, fever, headache, sore throat, "green strawberry" tongue and a fine rash on chest, neck and back. Each was given 2,500 units of scarlet fever antitoxin. In 24 hours both were free from rash and fever and apparently well. There was a light but definite desquamation some days later, and the original patient was now peeling in great casts and sheets.

* This case occurred on a farm 16 miles distant, in the middle of a Quebec winter. Horse and sleigh was the only available transportation. The shortest round trip was 5 hours; the longest 7. It was necessary to don gown and leave cap, coat and overcoat on "the barn floor" in zero weather.

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On the 23rd day another stepdaughter aged 12 was seen with a definite, moderately severe scarlet fever. She had managed to conceal it in the general confusion for 16 hours and it was then too late to inoculate her on the day of onset. She received 5,000 units scarlet fever antitoxin, and the next day she was reported nearly free of rash and was otherwise well. Marked desquamation occurred in this case also.

On the 31st day Mrs. T. was sitting up (convalescence had been delayed by a respiratory infection). The urine after examination was negative. Examination of the pelvis also gave negative results. The baby was nursed throughout and thrived. It is now 10 weeks old and all are in good health.

Remarks

This experience would tend to support the theory that puerperal fever may be at least in some cases, merely scarlet fever with the birth passages replacing the throat as the local focus of infection.

De Lee[1] quotes Ballyntyere as saying that pregnant women seldom get *real* scarlatina, but erythemata which resembles it due to sepsis, are not uncommon, especially in the puerperium.

Edgar[2] states that in regard to scarlatina the gravid woman enjoys a relative immunity in comparison with the puerpera. In discussing the pathological puerperium, he says that streptococci have been more successfully combated without than with the aid of serum.

Williams[3] declares that although scarlet fever is rarely encountered during the puerperium, its occurrence has given rise to much discussion. As a scarlatiniform rash is occasionally observed during the course of a puerperal infection, in many cases a differential diagnosis becomes very difficult. It would appear that the puerperal woman is to a certain extent immune to the disease. It is generally stated that infection may occur in the usual manner as well as by the entrance of the specific poison through wounds about the genitalia. The rash occasionally *appears first in the neighbourhood of the vulva* and thence spreads to other parts of the body. It is urged that the appearance of the disease on the third or fourth day of the puerperium speaks in favour of the transmission of contagion through the genitalia. In certain cases in the absence of characteristic manifestations, it is often impossible to differentiate between scarlet fever and puerperal infection.

Boxall[4] in his elaborate reports describes a series of 16 cases of undoubted scarlatina occuring during pregnancy and in the puerperal state. He declared that while *during* pregnancy the throat symptoms were unmodified, scarlet fever *after delivery caused little, if any, sore throat.*

Renoers declares that it is necessary to be careful not to make the diagnosis of puerperal scarlatina too rashly, because the decision largely influences both prophylaxis and the treatment.

Lash[5] says, "The pathological condition in puerperal fever produced by streptococcus hæmolyticus is the same as that of any hæmolytic streptococcus infection elsewhere in the body. Thus the various strains of the streptococcus, as those of erysipelas, scarlet fever or any septic focus may produce the same picture except in the case of the scarlet fever strain which may also produce a scarlatinal rash."

Clinically, however, the patient who is severely ill with scarlet fever is likely to be very toxic in contrast with the patient with other streptococcus infections, who as a rule is not.

The recent work of Nicholls[6] is of great interest. She found that, "Of twenty-one strains of streptococcus hæmolyticus isolated from 21 unselected cases of acute streptococcus infections, ten were found to be *S. scarlatinæ*, Of the ten patients in whom the infection was due to *S. scarlatinæ* five had acute follicular tonsillitis, three had acute pharyngitis, one had peritonsillar abscess and one had bronchopneumonia. None developed clinical scarlet fever. Nine of these patients had been intimately exposed to scarlet fever. Information on this point was not obtained in the tenth case."

Blake and Trask[7] have made observations which indicate that *S. scarlatinæ* may have at least two quite distinct methods of attack and that the defensive mechanism of the host may be dissociated. Variable combinations of these factors result in different clinical pictures of the disease.

Scarlet fever antitoxin is standardized on its

neutralizing values for rash producing toxin only, but some serums contain anti-bacterial substances as well. Blake[8] says, "Whether or not the presence of these anti-bacterial substances in the serum increases its therapeutic value lacks definite proof at the present time. It is possible that the anti-microbic substances may be of some value in preventing the development or checking the advance of the septic lesions which so frequently develop during the course of scarlet fever."

All insist that patients with incipient septic processes should receive more antitoxin and receive it early.

Rosenow[9] says, "It would appear that the supposed immunity to scarlet fever following an attack, and therefore perhaps following prophylactic inoculation, may mean chiefly immunity of skin and perhaps other tissues to toxin and not immunity of the throat and perhaps other structures to infection by true scarlatinal hæmolytic streptococci." He cites five cases which developed severe infection of the throat resembling that of scarlet fever due, according to the precipitin test, to scarlatinal hæmolytic streptococci despite the fact that the Dick test was negative and rash remained absent. Two of these patients had had scarlet fever.

Stevens and Dochez[10] writing later state that *S. scarlatinæ* is apparently a widely distributed organism and that infection with it does occur without rash. They also have isolated the organism from cases of angina in individuals who had negative Dick reactions. *They are satisfied from their observations that large amounts of scarlet fever antitoxin will prevent these infections.*

Meleney and Stevens,[11] pleading for the masking of operating personnel, state that they found hæmolytic streptococci in the throats of 33 per cent of an operating staff.

Meleney[12] in a later report says positive cultures of hæmolytic streptococci were obtained from 27 of 125 persons examined. Nineteen of 53 physicians gave positive cultures.

Conclusions

In puerperal fever with a scarlatiniform rash and without a history of scarlet fever, scarlet fever streptococcus antitoxin may be curative.

In puerperal fever, following known exposure of a non-immune person to scarlet fever, a scarlet fever streptococcus antitoxin which has been developed to include anti-bacterial substances would seem worth a trial.

Known contact with a source of scarlet fever by a woman at or near parturition is, in the present state of our knowledge, an indication for a large prophylactic dose of antitoxin, regardless of supposed immunity.

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AN OPERATION FOR HERNIOTOMY UNDER DIFFICULTIES

By Hugh Ross, M.D.

Clifford, Ont.

I was called out of bed early on Sunday morning, December 25, 1905, to see a patient in the village. He had been suffering severe pain all night from a hernia, which was of several years standing. Failing to reduce it by taxis under chloroform pushed to the limit to secure muscular relaxation, as strangulation seemed inevitable, if not already initiated, I decided that an immediate operation was necessary. In such cases I always called in surgical aid; but, as our village had no Sunday telephone service at that time, I could not procure a surgeon, an outside anæsthetist, or a nurse. So I decided to undertake the operation myself, and made arrangements with the patient's family to secure the services of the other local doctor. My two daughters, a nurse and a teacher respectively, home for the Christmas vacation, volunteered to prepare the room and the patient for operation.

We met at the house about 2 p.m. and got the patient and his surroundings ready; but at the

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appointed hour we looked in vain for my confrère. After a long wait, we saw him driving past and hailed him, but he replied that he had forgotten to tell the family messenger that he had another case five miles in the country, which required immediate attention.

Here was a dilemma, but we decided to take it by the horns. I put the patient under the anæsthetic and then committed its further administration to my daughter, the nurse, the only thing I could do under the circumstances. My little daughter, the teacher, donned a surgical gown, and thus robed to the toes and a little beyond them, acted her part as an excellent surgeon's assistant.

The only room available was a small one with a single window. The room had been stripped of its furniture and an old rug: I had sent over my surgical table, which was placed close to the window. In the room was an old sheet-iron stove, upon which stood a large kettle of boiling water to maintain moisture in the air.

Thus equipped, we proceeded with the operation, all not engaged being excluded from the room. Owing to the delay, the afternoon was far advanced before we got started, and, the day being cloudy and the shortest of the year, darkness began to fall before it was possible to complete the operation; so that we had to call in a light-bearer from the throng of neighbours in the adjoining room. The man sent was a stout, strong young fellow, who was instructed to keep his eyes on the wound and to make sure that the rays of the old-fashioned coal-oil lamp were shining where they were needed. From previous experience with light-bearers and other lay helpers, I thought it well to warn this one, and frequently questioned him as to his ability to endure the gory sight, and was as often assured that he was all right. But suddenly, without warning, he sprawled on the floor, letting the lamp roll away and pushing the stove from its moorings in his fall. The stove-pipes became disconnected and discharged volumes of smoke, which filled the room; the kettle tipped and emptied into the fire; the lamp discharged oil all over the floor, and the oil began to burn.

Meanwhile the protruding intestine of the patient was exposed to the smoke and the elements amid the reigning chaos. The surgeon and his lay assistant could touch nothing, as they were able to go a step farther than the renowned Sir John himself, and say with *truth*: "These hands are *surgically* clean."

My daughter had to give the patient an extra dose of the anæsthetic, lest he come to in the midst of Bedlam-let-loose. She picked up the lamp, threw it out of doors, trampled out the flames, called men to set up the stove, dragged out the oblivious bearer of the surgical torch, and summoned a fresh one, who appeared quite undaunted, and assured us that he, at least, might be safely trusted.

After a few moments of indescribable confusion, the operation was resumed, with the man of adamant wielding the lamp. Exhorted by the nurse to give warning of approaching faintness, he kept reiterating: "I'll be all right, Karry." But after a few moments he said dolefully, "Guess I gotta go, Karry." He was replaced by the third and last helper, who brought the news from the next room that the first words of the original torch-bearer, on recovering from his faint, were, "Them's two brave gurls!"

The operation was concluded without further incident. The case made an uneventful recovery, and resulted in a radical cure of the hernia, contributed to largely by my younger daughter's expertness, her fingers coming to the rescue just when they were needed, and by my older daughter's heroism in dealing with the chaotic situation, as well as her efficient administration of the anæsthetic.

Sir William as a Cricketer.—In looking over the files of the Champion for 1867 the score was found of a cricket match, Milton vs. Oakville, played in Milton on September 9th, which Milton won by 86 runs; total score for two innings 223 to Oakville's 137. One of the players for Oakville was W. Osler, who made 5 runs in the first inning and 4, not out, in the second. This was Sir William Osler, later one of Canada's most eminent sons. At that time he was a student either in arts or medicine. He was not a resident of Oakville, but it was understood here that he was visiting cricketing friends there who had invited him to join their team. Sir William retained his interest in cricket throughout his life.—Forwarded by Dr. S. H. Corrigan of Lampman, Sask., from the *Canadian Champion*, Milton, Ont., April 7, 1927.

Reviews and Retrospects

RECENT ADVANCES IN HÆMATOLOGY

5.—The Treatment of Anæmia *

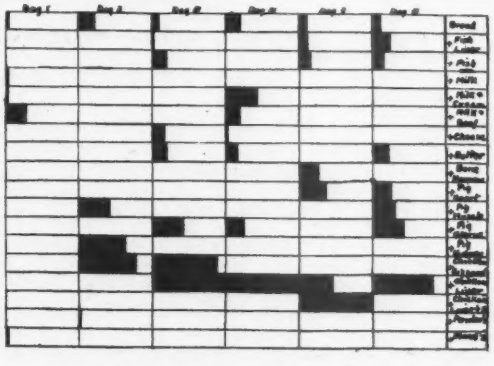
By Edward S. Mills, M.D., M.Sc.

Montreal

Less than a year ago a group of Boston physicians reported before the Association of American Physicians the favourable effect of a special diet in the treatment of patients with pernicious anæmia. Its superiority over other anæmia diets depends largely on liver and kidney, which must be taken in large quantities. Credit for this discovery belongs to Whipple and Robscheit-Robbins who demonstrated the efficacy of these substances in the treatment of simple anæmias, by experimental investigation. The first clinical application of Whipple's experiments was undertaken by Gibson and Howard, who recommended a diet rich in liver, fruits, green vegetables, and egg-yolk. Besides reporting favourable results on the nitrogen and iron metabolism in pernicious and other types of anæmia, they suggested that such a diet might lead to a more prolonged remission of the former disease.

Since their original publication, Whipple and his co-workers have continued their studies on the effect of various foodstuffs in the regeneration of blood in simple anæmias. The report of more recent experiments, which appeared in the January number of the *American Journal of Physiology* is of especial interest to clinicians because of its direct challenge of the value of inorganic iron and arsenic in the treatment of anæmia. In addition, it emphasizes even more forcibly than do the other papers by the same authors, the tremendous superiority of liver, kidney, and smooth muscle over other dietary substances. The entire investigation was carried out on dogs which were kept in a continual state of anæmia by frequent bleedings. The degree of anæmia over any given period was in this manner kept constant, so that the blood removed by venesection during this time represented the amount of blood formation. Thus the effect of feeding the dogs a standard diet plus various substances, could be compared with that obtained during the control period, when the animals were fed on the standard diet alone.

In the following chart we have attempted to synopsize Whipple's results on six animals, and to record them graphically. The black columns in each case actually represent grammes of hæmoglobin per two-week periods, formed while the animal was fed different articles of food plus the standard diet. The standard diet consisted of bread (first column) containing wheat flour, starch, bran, sugar, cod-liver oil, canned tomatoes, canned salmon, yeast, and a salt mixture. The figures demonstrate that liver, kidney, and smooth muscle, as represented by chicken gizzard and pig uterus, are of much greater value than other food substances in the regeneration of blood after simple anæmia. The lack of response from the exhibition of Fowler's solution and Blaud's pills (see chart) is striking. Earlier experiments by the same authors showed that sugar, gliadin, casein, meat extract, rice, potatoes, crackermeal, and vegetables, are almost inert. The most favourable results were obtained from beef liver, while lean beef and hæmoglobin and whole blood were somewhat less efficient in this respect. Splenectomy was without beneficial effect.



The same food substances which lead to rapid regeneration of blood in simple anæmia have been shown by these clinical investigators to hold true for the more complex anæmias of unknown etiology in the human subject. The superiority of liver and kidney over other foodstuffs as hæmoglobin builders has been demonstrated clinically and in the laboratory. Whether they do more than this is as yet only pure speculation. Until this question has been settled, it would seem to be unwise to cast down all the old idols, to discard entirely the use of hydrochloric acid and arsenic. The former cannot be replaced by any dietary or other measures, until such time as it can be demonstrated that the use of the liver diet results in the return of the normal secretions of the stomach. In the case of arsenic, it seems to be established that the drug is without effect on hæmoglobin production in simple anæmias, but these are hardly to be compared with anæmias of unknown etiology, in which blood destruction in the body is the outstanding feature. In the ordinary healthy person, restitu-

* (1) The Origin of the Red Blood Cell in Adult Marrow, *Canad. M. Ass. J.*, 1926, xvi, 174. (2) Laboratory Aids in the Diagnosis of Anæmia, *Ibid.*, 1926, xvi, 430. (3) The Blood Platelets, *Ibid.*, 1926, xvi, 818. (4) The Value of Splenectomy in Purpura Hæmorrhagica, *Ibid.*, xvi, 957.

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tion of blood after hæmorrhage is rapid and complete, even on an ordinary diet without inorganic iron or arsenic.

The one great disadvantage of the liver diet is that it is often not well tolerated by patients with severe anæmia. It is much less liable to cause any gastro-intestinal upset than to lead to an intense aversion to it. Patients refuse to eat it though its therapeutic value has been carefully explained to them.

Transfusion still holds its place in the symptomatic treatment of pernicious anæmia. There is no measure which can replace it where the anæmia is of an extreme degree. Apart from the actual presence of the donor's cells in the circulation, there appears to result a definite diminution in the degree of hæmolysis, or increase in the amount of blood formation. The net result is often the transformation from the stage of exacerbation to that of remission.

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MIGRAINE

By W. F. HAMILTON, M.D.

Montreal

At the Nottingham meeting of the British Medical Association in 1926, migraine occupied the attention of members of the Sections of Neurology, Psychology and Ophthalmology, the discussion being opened by Dr. Edwin Bramwell.*

Migraine is not always accompanied by headache nor is the headache always unilateral: sickness and vomiting may be absent. It should always be borne in mind that brain tumour, renal disease and syphilis may be accompanied by paroxysmal unilateral headache and vomiting, thus simulating true migraine.

The classical migraine attack comprises an aura, indicative both of local and general disturbance of the cerebral function; headache which is frontal and predominantly unilateral; nausea and vomiting. There may be headache alone, or vomiting may be the only manifestation, or again visual disturbances, aphasia or paraesthesia may be unaccompanied by either of these symptoms.

Dr. Bramwell expresses the opinion that migraine and epilepsy are not intimately related, and when found in the same patient or in the same family, allowance must be made for the possibility of coincidence. It would appear from the evidence adduced that migraine is a disorder commencing during the period of active physical and mental development in those belonging to families with a neuropathic taint, most often on the maternal side. It may be assumed that the migrainous member in such families is predisposed or subjected to some additional factor which renders him susceptible to this disorder. As exciting causes intense mental application, mental fatigue, physical exhaustion, menstruation, eye strain, fasting or the prolonged abstension from food, certain forms of diet in excess, alcohol, tobacco, a stuffy room, thunder, exposure to cold, etc. are the most common.

Dr. Bramwell submitted the suggestion that the symptoms of the migraine attack are to be accounted for by localized spasm and subsequent relaxation of the meningeal or cerebral arteries, or of both in varying degree; the prodromal symptoms (when these occur) resulting from spasm of the cerebral arteries, while the headache is attributable to re-establishment of the circulation in, and engorgement of the meningeal arteries.

It is not easy to answer satisfactorily the question how these changes are initiated. Disturbance of the sympathetic nervous system obviously accounts for some of the phenomena, *e.g.* altered colour of the face, unilateral hyperidrosis and contraction of the temporal artery, initiated in all probability by endocrine disturbance and disordered metabolism. Excesses, puberty, and menstruation, favour emotional excitement and may react as factors in the process, while low blood pressure, low blood sugar, and lowered alkaline reserve materially support this view of altered metabolism. Add to these observations those pointing towards certain transmitted anatomical peculiarities, *e.g.*, an unusually small or enclosed sella, disproportion between brain and cranial capacity, etc. and one has almost if not all the conditions accounting for the disorder known as migraine. It must be remembered, however, that more evidence is looked for to place this reasonable and suggestive explanation on a firm basis.

Dr. W. Halliburton McMullen discussing migraine from an ophthalmic standpoint remarks that of the characteristic subjective sensory phenomena, visual disturbances are by far the commonest; while they vary widely, loss of sight in part of the field is always present. Rarely there is a central scotoma and in a very few cases is the scotoma monocular. Ophthalmoplegic migraine in which the protracted headache is followed by paralysis for a period varying from a few days to several months, may be of the nature of true migraine, yet some doubt that it is so is justified. The ophthalmic symptoms clearly point to a conclusion that different parts of the visual apparatus are involved and that some source of irritation may exist in tract or centres, above the chiasma, in the cortex, the basal ganglia, or on the external geniculate bodies. Rarely have the

* *Brit. M. J.*, Oct. 30, 1926.

retinal arteries been found reduced in size. McMullen feels "that the immediate cause of the paroxysm is most probably a vasomotor change," and "considers that few modern writers give the ocular factor the prominence which he is convinced it ought to have."

Dr. Walter Timme of New York continued the discussion, dwelling chiefly upon a type of migraine called the intratemporal either unilateral or bilateral which may last for one or several days. In this type the pain described as a "fulness" within the skull of a throbbing, bursting, corkscrewlike character, radiated from the intratemporal region towards either or both temples to the vertex or to the mid-orbital region. The veins of the fundus on one side or on both sides according to the distribution of the pain, are markedly distended. Visual disturbances, ptosis and strabismus are frequent, and in rare cases trigeminal neuralgia may develop. An inordinate sense of well being, lightness of the head, and frequently a craving for sweets were prodromal, while the blood sugar was found relatively low. Rapid growth in height, and later in life mild acromegaly, pointed to the pituitary as the seat of the disturbance. The close anatomical relations of this gland to the cavernous sinus and its contained nerves, the optic chiasm and the Gasserian ganglion, favoured the view that enlargement of the pituitary, whether temporary or permanent, might afford an explanation of the disorder. Support was added to this view from the standpoint of function and from the x-ray examination. In states of fatigue, and low blood sugar, the pituitary gland as well as the thyroid and adrenals responded by hyperactivity. While admitting that other stigmata may be present, Dr. Timme believed those patients with congenitally small and enclosed sella turcica were predestined to headaches.

Hyperplasia of the pituitary may result if this gland is called upon unduly to compensate for certain individual inadequacies grouped under the term status thymico-lymphaticus, and attacks of pain may result, while later in life these attacks may disappear spontaneously, the sella having become enlarged. Dr. Timme pointed out that a relationship of migraine to epilepsy might be found in the view that pressure upon the infundibulum prevented the circulation of pituitary secretion while again a low blood sugar or hypoglycæmia due to moderate fasting may be the precipitating cause. Nocturnal incidence of epilepsy finds an explanation in the long fasting hours of night and on the same explanation treatment is indicated. The hereditary factor is a small sella turcica.

Dr. Gordon Holmes believing that migraine was a clinical entity with a constant and uniform pathological basis, found difficulty in accepting Dr. Timme's explanation of migraine as well as that offered by Dr. Bramwell. He thought the symptoms of migraine could be more easily explained by the assumption of a local swelling of the brain due to a local and temporary alteration in the osmotic relations of its substance with that of the fluid in which it was bathed. This view Dr. Holmes supported by assuming first that a local change in the brain must be present, and this could scarcely be due to a toxic substance in the circulation; second, the work of Reichert shows that such swellings occur; third, several migrainous persons had been relieved of pain by opening the skull; and in the fourth place the peptone treatment might act by inducing changes in the reactions of the proteins.

Regarding the treatment of migraine, while no decision is yet arrived at as to the pathology of this disorder, it must remain empirical and symptomatic, due consideration being necessary to each case as a therapeutic problem. Bodily fatigue, brain fag and long fasting are to be avoided. Habits of living and thinking should be carefully investigated and corrected, and all ocular defects should be remedied. Of drugs, luminal seems to hold first place with those expressing an opinion, in doses of one and a half grains daily at once or in divided doses.

RECENT ADVANCES IN KNOWLEDGE OF CORONARY CIRCULATION

By Harold N. Segall

Montreal

Since the publication of Anrep's[1] comprehensive review of the literature on the regulation of the coronary circulation there have appeared a number of articles that are replete with new and interesting information. The authors of these papers have bridged some wide chasms in the knowledge of the blood supply to the heart, and have solved some old questions. In the past, pharmacological and physiological studies of the coronary circulation by different workers using different animals have led to conflicting results. Anrep points out very clearly that these differences are to be explained by the variations in the percentage of error of the particular kinds of technique, and also by the fact that the mechanism regulating coronary circulation is not the same in all the animals studied. In order to design experiments for the study of the coronary circulation, and especially for the investigation of problems related to those of human coronary circulation it is obviously necessary to have a satisfactory knowledge of the comparative anatomy as well as of the human embryology of the blood supply to the heart.

Grant[2,3,4,5], and his collaborators have recently made several significant contributions on these subjects. In their study of the comparative anatomy of the cardiac coronary vessels Grant and Regnier[2] trace the evolution of the blood supply to the heart from the most primitive, avascular hearts to the mammalian which closely simulate the human heart. In ammocoetes there are no coronary vessels; the myocardium is a spongy network of trabeculae and blood courses

in the intertrabecular spaces. The frog's heart shows a slight advance; the auricles and ventricles also consist of a spongy network of muscle trabeculae which enclose blood sinuses but the musculature of the bulbus cordis is condensed and is supplied with coronary vessels which extend for a short distance on to the ventricle where they lie on the epicardium but do not penetrate the musculature. In vertebrates higher than amphibia a completely spongy myocardium exists only during development and as the musculature undergoes cortication coronary vessels appear and function in supplying the myocardium with blood. Communication between the intertrabecular spaces and coronary vessels is maintained through the anastomoses of Thebesian with coronary vessels; moreover, the capillaries of the adult heart develop from the primitive intertrabecular spaces. In the lower species, the larger coronary arteries and veins are extra-cardiac, and are usually arranged in a cephalic and a caudal group. As the condensation of the myocardium progresses they approach the heart along all convenient attachments from the nearest sources of supply. The cephalic arteries pass from the hypobranchial arteries along the truncus arteriosus and bulbus cordis. These are at first small and unimportant, while the caudal group of arteries form the main blood supply to the heart; arising from branches of the dorsal aorta the caudal arteries pass along the cardiac ligaments (fibrous bands between the heart and body wall) to the ventricle. The small cephalic veins enter the jugular veins; the large caudal veins leave the heart along the cardiac ligaments, and enter the epigastric veins and Cuverian ducts.

In higher vertebrates, with reduction and disappearance of the cardiac ligaments. the cephalic vessels become the larger and more important until finally in mammals the cephalic vessels are the only ones present. Further, with elimination of gills the origin of the cephalic coronary arteries is shifted nearer to the heart itself so that in mammals they arise from the base of the aorta. Similarly the veins cease to wander beyond the heart; they empty into the sinus venosus or, in mammals into the sinus coronaries. "By this or a similar reading of the facts of comparative anatomy an interpretation of the development of the mammalian coronary vessels and of their variations becomes possible. The coronary veins representing the venous element of the caudal vessels grow over the heart from the sinus venosus; the coronary arteries, the arterial element of the originally small cephalic vessels appear a little later, supply first the truncus arteriosus and bulbus cordis and then extend to the whole heart."

Grant[3] also reports his study of the embryology of the blood supply to the heart in the rabbit. Confirming the descriptions of previous observers he found that before veins or arteries appear, the blood supply to the muscular trabeculae is provided by blood in the intertrabecular spaces which are at this stage sinusoids in the process of being lined by endothelium. Minot suggested that this form of blood supply is analogous to that found in the lamprey and to some extent in fishes and amphibia. In the material which he studied Grant found that the veins are the first vessels to appear. In a 7 mm. embryo they are seen as outgrowths of the endothelium lining the left horn of the sinus venosus. They spread round the right and left auriculoventricular grooves to the bulbus cordis and also in the dorsal interventricular furrow to the apex of the heart. From these regions branches grow over the ventricular surface of the myocardium and enter it, communicating with the intertrabecular spaces of the ventricle. Outgrowths also occur from the endothelium lining the auricles and ventricles and these give rise to epicardial capillaries. The auricular outgrowths connect with coronary veins and form the Thebesian vessels of the adult auricle. The ventricular outgrowths join with each other and with branches of the coronary veins. Thus there exist numerous direct communications between the cavities of the auricles and ventricle and coronary veins. The coronary arteries appear a little later as endothelial sprouts from the base of the aorta. Both arteries pass at first to the bulbus cordis and then spread over the rest of the heart uniting with the capillary network already formed by the veins and intertrabecular spaces in the developing myocardium. Further development is marked by continued growth of the arteries and veins. The intertrabecular spaces of the ventricle are for the most part reduced to capillaries in the condensation of the myocardium and joined with the arteries and veins, persist to form an integral part of the adult coronary circulation.

These investigations of the comparative anatomy and embryology of the blood supply to the heart provided Grant[5] with a very plausible explanation of the genesis of an interesting human cardiac anomaly. In the case reported by Wilson and Grant[4], the heart of a fourteen months old female child presented an almost total absence of interventricular septum, marked pulmonic stenosis and an aneurysm-like nodule projecting from the right ventricular myocardium. This nodule was found to have a fibrous capsule and to contain much blood: the ventricular wall in its vicinity was especially thick and contained a "considerable admixture of fibrous tissue and numerous blood filled spaces These spaces were found to communicate freely with the cavity of the ventricle and with coronary vessels." They are therefore analogous to the sinusoids in the embryonic heart which normally become capillaries. Grant interprets the presence of the blood filled spaces in this heart as "a persistence and growth of the intertrabecular spaces of the compact myocardium."

Grant's anatomical studies form an important part of the foundation for the comprehensive investigation of the comparative physiology of the blood supply to the heart. At present there exist

isolated known facts about the pharmacology and physiology of the coronary circulation in different species of vertebrates, but these do not, as yet, lend themselves to satisfactory correlation along phylogenetic lines. A very great part of the work that has been accomplished in the study of heart physiology was done on the dog. It is interesting to recall that Harvey used dogs to demonstrate the circulation, and that the classical investigations of the mechanics of circulation by Starling and of heart rhythm by Lewis were also made on this species of vertebrate. The advantages of using this animal lie not only in its availability, but also in that its physiology has been shown to simulate that of the human species in a great many respects. Until more satisfactory knowledge of the phylogenetic and ontogenetic aspects of coronary circulation is obtained the dog's heart must remain one of the most suitable for investigating physiological and pharmacological problems related to human coronary circulation. Using the denervated heart-lung preparation of Starling and the innervated heart-lung-brain preparation of Anrep, Anrep and Segall[6] studied the mechanical and nervous regulation of coronary circulation in the dog. Their technique for measuring the amount of coronary flow was similar to that of Morawitz and Zahn and of Markwalder and Starling; a Morawitz cannula was inserted into the coronary sinus and the blood collected in this way was taken as an index of total coronary flow. They repeated and confirmed the observations of Markwalder and Starling and others with regard to the influence of aortic blood pressure, cardiac output per minute and heart rate upon blood flow through the coronary vessels in the "denervated" heart-lung preparation. They found that if the aortic pressure is maintained at a constant level, variations in heart rate or in volume of blood flow in and out of the heart chambers, however extreme these variations may be, leave the coronary flow unaffected. But, a rise in mean aortic pressure causes a corresponding augmentation and a fall in aortic pressure a corresponding diminution of coronary flow. In another study[7] as yet unpublished, which Anrep mentions in his review, he and his collaborators showed that the coronary arteries receive blood from the aorta mainly during ventricular diastole, whereas during systole there is little or no flow into the coronary arteries but there is a great venous flow from the coronary sinus. It is therefore the diastolic blood pressure which governs the amount of coronary blood flow. Smith, Miller and Graber[8] using a preparation of the whole animal also came to the conclusion that the amount of coronary blood flow varies as the diastolic blood pressure.

The nervous mechanism for the regulation of coronary circulation was studied with the aid of the heart-lung-brain preparation; the heart and lungs and the brain separately perfused with blood by mechanical devices, remained connected by the vagus and sympathetic nerves. With these nerves intact blood pressure exercises the same influence as in the *denervated* preparation, and changes in heart rate also have no effect upon the coronary blood flow. But Anrep and Segall observed that an increase in total cardiac output causes an increase in coronary flow and that this phenomenon disappears after the cutting of both vagi, whereas it is not affected by section of the sympathetics (removal of the stellate ganglia). This evidence points to the existence of a reflex mechanism affecting coronary circulation, for which changes in volume of blood-flow in and out of the cardiac chambers is a direct or indirect exciting agent, whilst the vagus carries both the afferent and efferent nerve fibres. These investigators provide further evidence to show that the coronary vessels are subject to nervous regulation by the following observations; (*a*) section of the vagi causes marked increase in coronary flow (*b*) stimulation of the peripheral end of either of the cut vagi causes diminution in coronary flow, (*c*) removal of the stellate ganglia causes no remarkable change, but stimulation of a ganglion affects a great increase in coronary flow and adrenalin has a similar effect. In other words, the vagus carries vaso-constrictor fibres and the sympathetics, vaso-dilator fibres to the coronary vessels. Stimulation of the central end of one cut vagus with the other vagus intact causes at times first a retardation then an increase in coronary flow. Thus the sympathetic vaso-dilator centre may be stimulated reflexly. Furthermore, with both vagi cut, the production of cerebral anæmia results in augmentation of the coronary flow due to central stimulation of the sympathetic centre. With all nerves intact, an increase in cerebral blood pressure causes diminution and conversely a decrease in cerebral blood pressure causes augmentation in coronary flow. These facts are significant in that they indicate the existence of a central mechanism in the brain for the nervous regulation of coronary circulation.

Thus, it appears from these studies that the coronary circulation is subject to nervous control, both reflex and central. This work finds strong support in the anatomical studies of Woolard[9], who has demonstrated the rich nerve supply to the coronary arteries. From his investigations it appears that the large arteries are supplied both by vagus and sympathetic fibres, but mainly by the latter whilst the smaller arteries are supplied chiefly by vagus fibres. Assuming that under physiological conditions changes in coronary blood-flow correspond principally to variations in the calibre of the smaller vessels, i.e., the arterioles and capillaries, Woolard's anatomical observations offer an explanation for the relatively greater sensitivity of the vagus by the regulation of coronary circulation as found by Anrep and Segall.

The reflex dilatation of the coronary vessels due to changes in volume of blood flow through the heart must play an important rôle in adapting the heart to variations in the amount of work that it is called upon to perform. During

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physical exertion the blood pressure rises relatively slightly; the amount of coronary blood flow must however increase considerably and since changes in heart rate have no effect on coronary flow it remains for the reflex nervous mechanism to bring about dilatation of the coronary vessels; other factors such as various metabolites or lowering of the p.H. of the blood may aid in this, but at present the consideration of these factors must be left open as the evidence concerning them is inadequate. Questions as to the pathological physiology of the nerve supply to the coronary vessels now arise; coronary artery spasm due to central or reflex stimulation of the vasoconstrictor mechanism must be seriously considered and studied as a possible cause of certain types of angina pectoris.

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Danger of Introducing Iodized Oil into Tracheobronchial System.—Edward Archibald, Montreal, and A. Lincoln Brown, San Francisco, call attention to the possible dangers of introducing an iodized oil into the tracheobronchial system, although they are firmly convinced of its great value as a diagnostic procedure. The method is, on the whole, a safe one. But the unfavorable and even fatal complications already at hand, though few in number, are sufficient to warrant a close analysis of the various causes of possible trouble, in the hope of establishing definite contra-indications to the use of the method. Experiments made by others, and their own, lead the authors to believe that no trust can be placed in any presumed antiseptic action of iodized oil; therefore, any organisms carried down with the oil from the buccal cavity or tracheobronchial tree into the alveoli may remain an active source of infection. Moreover, it is conceivable that retained iodized oil may act as a plug and imprison organisms in the alveoli until they cause harm. Generally, a large percentage of the oil introduced is coughed up and either expectorated or swallowed. However, by one process or another, some at least is absorbed and is eliminated, mainly in the urine. The potential dangers of the administration of an iodized oil (lipiodol) into the tracheobronchial tree from the time its administration is begun until its final complete elimination from the body may be tabulated thus: I. Administration: Each method of administration has, besides its respective manipulative and technical difficulties, certain potential dangers. II. The transport of infective material from the mouth or larynx by the oil into the lung alveoli. III. Cough: The introduction of lipiodol—a foreign substance—into the tracheobronchial tree generally excites cough both at the time of its administration and after it has reached the bronchi of the second order. This cough may in turn: (*a*) Be the means of activating the pathologic process already present in the lungs. (*b*) Bring about the spread of the lipiodol carrying with it infected material into healthy alveoli, and so cause the rapid development of a bronchopneumonia. IV. Mechanical Factors: Acting as a foreign substance in the lungs. V. Drug Factor: Since it is impossible to regulate the dosage of iodine administered by the intrabronchial route, either as to amount or rapidity and duration of absorption, such a procedure is not only irrational on the basis of scientific therapeusis but: (*a*) Subjects the patients to the possibility of iodism. (*b*) In tuberculous patients may actually bring about a sensitization effect with activation of quiescent disease. (*c*) Allow the possibility of adding an acute process of the respiratory tract to the already present pathologic process, either from iodism or from the usual congestive action of iodine, or from the projection of infected sputum through coughing into healthy portions of lung. Complications reported in the literature which have occurred through the intratracheal use of iodized oil have led to the formulation by various authors of general contra-indications to its use. Three instances of complications occurring after the use of iodized oil, one of which ended fatally, show the potential danger of this method in cases of tuberculosis and infections of the upper respiratory tract. The conclusion is therefore reached that the introduction of iodized oil into the tracheobronchial system carries with it a certain definite degree of danger from various sources, which should be weighed before patients are subjected to its indiscriminate use.—*J. Am. M. Ass.*, April 23, 1927.

Editorial

THE DANGERS OF LIPIODOL AS A BRONCHO-PULMONARY INJECTION

THE enthusiasm which attends the introduction of a new method of diagnosis is usually followed in due time by a reactionary warning concerning its insufficiencies or its dangers; and it is therefore doubtless with that mildly self-gratulatory feeling accompanying the fulfilment of prophecy that the discerning medical public will read the article by Archibald and Brown* upon the dangers incident to the introduction of lipiodol into the broncho-pulmonary tree. The admittedly great value in diagnosis, the striking and beautiful character of the x-ray pictures, and the easiness of the technique, have all contributed to the rapid and wide dissemination of this method as well in America as in Europe. Although introduced (by Sicard and Forestier) only some three or four years ago in France, and on this side practised for the first time, we believe, by Ballon in the Royal Victoria Hospital, Montreal, about two years ago, it has already spread so widely as to place the ignorant or the unbeliever in the class of *arrières*. But the pendulum now swings back to a juster balance.

While several writers, reporting series of cases of lipiodol injection, have signalized as it were, in passing, possible or actual dangers, it has remained for Archibald and Brown to write a complete review of this subject. Their article sets forth all the possible causes of danger, recounts the cases of trouble reported in the literature, and reports the untoward complications that have occurred in the Royal Victoria Hospital series.

The purpose of this editorial is to draw the attention of our readers to the article in question, which deserves reading in the original, rather than attempting to analyze it. Yet it should be mentioned that in this series of over one hundred injections, mostly done by the bronchoscopic method, two fatalities occurred; one suddenly from "pleural shock," and one from a rapidly spreading septic pneumonia. It should be added that both patients, as shown by autopsy, were very seriously ill before the injection, with infective lesions of the lung parenchyma; and the lesson is that such should be excluded. In a series of a dozen cases of tuberculosis the lipiodol appeared to cause a flare-up of the disease in three. These were all in the stage of actual or suspected activity. Only in the long standing "good chronics" is the method admissible in the tuberculous subject. In spite of these and other minor misadventures, the authors are strongly of the opinion that the method in properly selected cases is safe as well as valuable, and, indeed, often indispensable. Their paper is intended not to discredit it, but to make more precise its contraindications. As such it deserves a widespread publicity.

* Archibald and Brown, *J. Am. M. Ass.*, April 23, 1927, p. 1310.

ANÆSTHESIA AND HYPNOSIS

THE March number of the *Proceedings of the Royal Society of Medicine* contains an interesting paper on the "Physiological Basis of Hypnosis and Suggestion." The writer, Mr. S. R. Wilson of Manchester, believes that the various phenomena of hypnosis and suggestion are reflex actions—conditioned reflexes—taking place in the subconscious layers of the brain.

Physiologists now classify reflexes as unconditioned or conditioned. Unconditioned reflexes are those in which the reflex response is fixed and varied but independent of conscious intervention or surrounding conditions. The pupillary, and the corneal reflexes and the knee jerks are examples. Conditioned reflexes are those in which the experimenter has something to say as to what will happen.

The grey matter of the cortex may be re-

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garded as consisting of three layers of nerve-cells, an outer or pyramidal layer, a middle or granular layer, and an inner or polymorphic layer. For convenience of reference these layers may be referred to as the supra-granular, the granular, and the infra-granular layers respectively.

The infra-granular is just as well developed in the lower animals as in man. It is the instinctive layer of the brain. The granular layer is most developed in the occipital region. It subserves the reception and transformation of sensory impressions, and is the artistic layer of the brain, the seat of music, mathematics and subconscious memory. It obeys the laws of reflex action.

The supra-granular layer is most developed in the pre-frontal region. It has to do with the higher psychical functions, and is governed by the laws of argument and reason. The difficulty in investigating hypnosis and suggestion is due to continual interference of the conscious brain. If non-interference be secured the subconscious layers blindly accept any statement made to them.

Inhibition of the conscious brain may be obtained by psychological methods, by drugs, or by means of mixtures of nitrous oxide with oxygen or air.

(1) Psychological methods may be rapid or gradual. The latter is the more certain method and consists in monotonous repetition. With patience, success is attainable with practically any subject.

(2) So far the drug which promises the greatest success is caffeine. It augments all conditioned reflexes and diminishes inhibitory processes. The effect develops in half an hour. The writer suggests that it might be useful for pre-medication in anæsthesia.

(3) By means of nitrous oxide and either oxygen or air a perfectly suggestible state may be produced without loss of consciousness. The activity of the conscious brain is diminished by a very gradual process of oxygen limitation. The most highly evolved nerve cells are more sensitive to the reduction of oxygen than the subconscious centres, and are temporarily put out of action, with the result that perfect suggestion phenomena, including analgesia, are easily obtained.

When he had finished reading his paper Mr. Wilson gave a demonstration, showing the effects of suggestion and hypnosis, both by psychological methods and by mixtures of nitrous oxide and oxygen.

It is interesting to recall the fact that in February, 1846, James Esdaile, a surgeon in India, published a book on "Mesmerism", and its practical application in surgery and medicine, in which he gave details of seventy-three surgical operations which he had performed painlessly while his patients were in the hypnotic state. His discovery, received with scornful incredulity by the medical profession, was prevented from acquiring the importance it might otherwise have had, by the discovery, a few months afterwards, of the anæsthetic powers of ether.

It is not long since Dr. James Cotton of Toronto announced the manufacture of a brand of ether, which, when inhaled in very small amount, had the power of preventing pain during operations without depriving the patient of consciousness. It was found, however, that analgesia could be induced in some patients, but by no means in all, and that a similar result could be obtained by the use of other brands. Some of the patients inhaled so small an amount of ether that it is not unreasonable to suspect that their insensitiveness to pain may have been due to suggestion. Perhaps the time has come to find a place for Esdaile's discovery among the measures at the disposal of the anæsthetist.

W. B HOWELL

ON POLIOMYELITIS

POLIOMYELITIS must still be regarded as one of the most dreaded diseases, and one which always gives the physician great anxiety in regard to its final outcome. While a disease to which humanity has been liable from remote times, as appears to be indicated by references in classical literature to "he that hath a withered limb," not until towards the end of the last century did it assume the characters of an epidemic, claiming in one small district in Sweden 1,500 victims, and more recently in New

York State, exacting a toll of 5,000 deaths, and more than double that number of paralyzed children.

It is therefore with much interest that we have read Dr. James Collier's address on the epidemiology and pathology of this disease, delivered before the Portsmouth Division of the British Medical Association.* The speaker began his address by referring to the change which has taken place in the views of the profession regarding this disease. Formerly regarded as non-infectious and confined chiefly to the early years of life, Dr. Wickman, as a result of his investigations in the epidemic of 1905 in Sweden, was able to prove its infectious character. This physician also showed proof that it was conveyed by humans and almost entirely by those who do not suffer with symptoms of the malady. More recently, Kling, Pettersen and Wernstedt have shown that in family groups in which one is suffering from the disease, there are generally three or more other members who become carriers of the virus and are therefore able to transmit the malady. This fact is now generally accepted that poliomyelitis is not transmitted by the one who is suffering from it, but is conveyed by other human carriers.

The virus of this disease is filtrable, resists dessication for twenty four days, and, while unaffected by fifty per cent glycerin or five per cent carbolic acid, it is promptly rendered impotent by hydrogen peroxide or one per cent solution of permanganate. The actual organism is described as a very small round body called a globoid of which fifty would lie easily on the surface of a red blood corpuscle.

Dr. Collier considers that this virus is communicated from person to person by "droplet infection," that is by the spray thrown from the respiratory passages of a carrier even in conversation and which may reach the respiratory mucous membrane of a previously uninfected person. The receiver of such virus may (1) develop the disease, (2) become a carrier, or (3) become immune relatively or absolutely; which of these three will depend upon the dose of virus received, the individual's power of destroying the virus, and the rapidity with which the protein content of the virus stimulates or depresses the immunizing mechanism of the receiver. If the disease develops, the virus seems to lose its virulency; the sick individual does not transmit the disease; if the person becomes a carrier, the virus apparently becomes more virulent for a time but loses its potency gradually, so that the person ceases to be a carrier in about a fortnight. There do not appear to be chronic carriers such as exist in diphtheria and epidemic meningitis.

The evidence is apparently quite strong both that a patient with poliomyelitis is not infectious, and that a carrier, and especially a recent carrier, may be very infectious. Dr. Collier quotes an instance. One day at a market town a farmer from a country village sold a horse to another farmer, who lived some twenty miles away, and as part of his contract had to deliver the horse at the farm of the purchaser. Before he left home, his child had taken ill with poliomyelitis. He took his midday meal at the house of the purchaser, sitting between two of the children at table. Within forty-eight hours both of those children were ill with poliomyelitis, and a few days later their mother and another child were stricken with the disease. Similar instances could be multiplied indefinitely.

An excellent test that a developed case appears to be incapable of infecting others is to remove such patient in an early stage, and place it in a community of susceptibles. This has been done frequently, but there is not one single case on record in the whole of medical literature in which a patient with the disease when transferred to a hospital transmitted the disease to another child. Dr. Batten with thirty years experience in the Great Ormond Street Hospital investigated this point very carefully and vouched that no case admitted into the hospital had ever given the disease to surrounding children.

Now if these facts which have just been stated are correct it follows that when a case of poliomyelitis occurs in a semi-isolated community such as a school, it has been conveyed by a carrier, who is apparently in good health; all the boys become either infected and will become patients or are carriers, or develop immunity. They should therefore be kept together, and the probabil-

* Epidemiology and Pathology of Poliomyelitis by James Collier, M.D., F.R.C.P., *Brit. M. J.*, April 23, 1927.

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ity is that the epidemic will die out without further trouble. Before the epidemic has died out, however, the school should not be disbanded lest infection be spread through the country.

The virus of this disease has never been found except upon the mucous surfaces or within the nervous system. It has been proved to be capable of passing through the whole length of the intestine with undiminished potency, but is destroyed in the blood stream. When once it reaches the nervous system through the lymphatics the virus appears to travel rapidly. It gains access apparently by one path only—the nerves—travelling either along the perineural lymphatics or along the axon, just as the virus of rabies does, or as do the toxins of tetanus and diphtheria. It has also been shown that the path to the central nervous system is by the anterior roots only There seems to be some form of block at the ganglia of the posterior roots which prevents any passage of the virus through them; for if the anterior roots be divided, injection of any of these poisons into the nerve is not followed by infection, whereas if the posterior root be divided infection takes place as in the intact animal. The effect of the virus is twofold; first there is a poisoning of the nerve elements which destroys their function, a poisoning which may be recovered from or which may end in degeneration of the nerve element. Second there is a local inflammatory reaction, often so intense as to lead to an actual necrosis of the infected region. This inflammatory process leads to the outpouring of lymphocytes in large numbers round the blood vessels, producing marked œdema of the tissues. and to this extent resembling the lesion of encephalitis lethargica. But in poliomyelitis there is always a considerable number of polymorph cells mixed with the lymphocytes distinguishing its lesions from those of syphilis or encephalitis.

Associated with the above statements on the etiology and pathology of poliomyelitis the recent paper on conditions met with in the accessory sinuses of the nose by Dr. Eden and Dr. Yates* of Birmingham University, an abstract of which is published in this issue, is of much interest. These investigators found that, while in the normal nose the mucous secretion was carried along in definite channels by the cilia, cases are met with in which as the result of infection either of an acute virulent character, or of a milder and more chronic one the secretion becomes altered, and the movements of the cilia affected, and either increased or diminished.

Yates states that he has observed four stages in this pathological condition of the mucous membrane. In the first three types these changes give rise to local effects of an inflammatory character such as rhinitis and laryngitis. In the fourth type, however, the cilia become paralysed, and as a consequence the secretion becomes stagnant. More important still is the condition of the mucous membrane itself, the permeability of which becomes greatly increased, permitting the toxic absorption of toxines and invading organisms. This change in permeability becomes at once apparent when a solution of indigo carmine is injected into the sinuses, and can be recovered from the urine in fifteen or twenty minutes. In the more normal conditions of the mucous membrane, no absorption takes place and no trace of the dye can be found in the urine.

It appears probable, therefore, that in such abnormal conditions of the mucous membrane filter-passing micro-organisms can be absorbed and produce disease, while under less unhealthy conditions of the mucous membrane absorption does not take place, but pathogenic organisms may persist in the passages and may be transmitted to others by droplet infection. In this way we may explain how the virus of diseases like poliomyelitis and encephalitis may attack some individuals producing disease, while others equally exposed may become carriers of the disease and, immune themselves, transmit the disease to others who may come in contact with them in the fine spray from nostrils and the buccal cavity.

* The Treatment of Encephalitis Lethargica by the Removal of Possible Etiological Factors, Geoffrey Eden and A. Lowndes Yates, *Brit. M. J.*, April 16, 1927, p. 714.

ON ACUTE RHEUMATISM

THE effort at present being made to investigate the conditions underlying the development of acute rheumatism in children and lessen the heavy toll which rheumatic carditis exacts of young life both in England and America has awakened general attention to the fact that while the death rate in the case of so many other diseases is falling in the case of rheumatic heart disease it is rising. In 1924 the Ministry of Health in England instituted an investigation into the incidence of all forms of so-called rheumatic disease, but without much practical result. At the annual meeting of the British Medical Association in Portsmouth in 1925 a special Committee was appointed to report on the conditions which appeared to influence the development of rheumatism. This Committee published a report last year dealing with what appeared to them to be important predisposing causes and urging the institution of measures for the after care of those suffering from rheumatic hearts. This Committee in its report recognized the etiological importance, in its opinion, of dampness in living apartments, and in the soil on which houses were built and recommended tonsillectomy as having a definite influence in preventing the development of an attack. This year the Medical Research Council have published a report[1] by its London Committe, who acting under the advice of Dr. G. F. Still as chairman, investigated the influence exerted by the several social conditions of life on the development of rheumatism in children, paying special attention to the incidence of rheumatism in children of the hospital class. The data from which conclusions were drawn were gathered from the medical and social histories of 721 families which had one or more rheumatic children in the Hospital for Sick Children in Great Ormond Street, and in St. Thomas' Hospital—both in London—and in the Royal Hospital for Sick Children, in Glasgow. It was hoped in this way to make allowance for variations in local conditions and climate. As 'controls' of these families with rheumatic children the histories were taken of 200 families, with non-rheumatic children under hospital treatment, divided equally between London and Glasgow. In addition to the above the histories of 1872 children resident in the various Poor-law residential schools were analysed. With the histories of these hospital children were compared the histories of 700 consecutive children of well-to-do parents seen in private practice. These latter had an incidence of rheumatism in 0.7 per cent, whereas 1,000 consecutive children in the out-patient department of King's College Hospital gave an incidence of 13 per cent suffering from rheumatism, thus confirming the impression that acute rheumatic infection is more common in the hospital class of patient. The incidence of rheumatism, however, among the hospital class did not appear to bear any direct relation to the degree of poverty. The committee found that if hospital patients were divided into three grades according to their financial position, the poorest of the three showed a lower incidence of rheumatism than the other two. Careful investigation of associated conditions met with in these children appeared to indicate that lack of effective maternal care in regard to clothing, and exposure to cold and damp had a definite influence. The infrequency of rheumatism in the Poor-law residential schools investigated, (only one per cent compared with published statistics in some elementary schools of 3.6 per cent,) confirms the view that a high standard of food, clothing, housing, and general care have considerable influence in preventing the occurrence of this disease.

Investigation of the question of heredity showed a picture of rheumatism attacking several members of one generation rather than of its transmission from one generation to another. Analysis of the data regarding build of body, and colour of the skin, hair and eyes, brought out statistics tending to show that the darker types have a greater predisposition to rheumatism than the lighter types; a conclusion opposite to Dr. Shrubsall's in 1903.

On the possibility of the transmission of infection from one sufferer with rheumatism to others in the same family, the Committee considered that the data collected did not

justify any definite statement, although many facts gathered would appear to be consistent with such a view. Regarding the association between tonsillar infection and rheumatic disease the Committee reported that while an unhealthy state of the tonsils is not an invariable factor, nevertheless the incidence of the disease in tonsillectomized children was less frequent and the severity of an attack was apparently reduced. The opinion was expressed by many that tonsillectomy diminishes the tendency to pyrexial attacks, and in some measure protects from permanent heart disease.

It will be a matter of some disappointment that Dr. Still's committee did not offer any indication as to the means which should be adopted for the prevention of rheumatism. The most hopeful line appears to be the improvement of the environmental conditions of the poor so that they approximate to those in institutions in which rheumatism is less common. No definite statement is made as to the proportion of those attacked by rheumatism who are left with damaged hearts. Some hospital figures place it as high as fifty per cent, but this estimate would appear to be too high in the case of private patients.

A very depressing paper appears from Professor J. A. Nixon[2] of Bristol, in which he claims that even a rigid system of rest fails to stem the progress of rheumatic carditis once it has manifested itself. Dr. Carey Coombs, on the other hand, in a Chadwick lecture[3], quotes evidence of apparent recovery from definite carditis in a surprising number of cases in children, who suffered from well marked rheumatism. The general opinion in the profession undoubtedly confirms the observation made by Francis Simpson in 1877 that cases of rheumatic fever are less frequently attacked by rheumatic carditis, when kept strictly at rest for a long time, and this dictum must be considered as forming the basis of the modern treatment of acute rheumatism.

In studying the report of this Committee one is impressed with the care and tact shown by this group of workers in carrying out inquiries as to family incidence, as to social and housing conditions, and as to the association of sore throat with an attack, and one must express great regret that such a careful investigation has failed to give any clear view of the lines upon which prevention of the disease should be attempted; it would seem improbable that much further progress can be made until the causative agent of acute rheumatism is actually identified.

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THE MOST RECENT EXPERIMENTS WITH "BACILLE CALMETTE GUERIN" *

CALMETTE and his co-workers at the Pasteur Institute several months ago published an account of a series of experiments on animals, using large doses of the organism (Bacille Calmette-Guérin) with which they are vaccinating infants and calves against tuberculosis. These experiments were rendered necessary since some observers, *i.e.*, O. Medin, R. Kraus, Von Pirquet and Loewenstein, have been quoted as saying that after long sojourn in the animal body the organism might regain its property of forming tubercle in its original virulence.

It must be remembered that the claims for the organism were that (1) it was an avirulent organism which had been so rendered by 230 successive subcultures of an original virulent bovine strain on glycerinated beef bile over a period of 13 years; (2) it formed tuberculin; (3) it produced Koch's phenomenon; (4) antibodies were formed in the vaccinated animal; (5) animals so vaccinated showed a degree of resistance to reinfection with virulent organisms. Hence, as one of

* "A Note on the Control of Bacille Calmette-Guérin by Experiments on Rabbits and Guinea Pigs," A. Calmette, C. Guérin, L. Negre and A. Boquet, *Ann. Pasteur Institute*, 1926, xl, 574.

its cardinal characteristics, namely its avirulence, was challenged, it was obvious that such a series of experiments should be reported.

It may be said at the outset that Calmette has failed to obtain any *de facto* evidence which would lead him to conclude that the organism can regain its virulence by any of the ordinary methods employed.

His experiments were made on rabbits and guinea pigs and include various methods of inoculation, *i.e.*, by subcutaneous, intraperitoneal, intracardiac, intravenous, oral and intrapulmonary routes and by successive passage from animal to animal. With large doses (100-150 mg.) granules appear in the spleen, liver and lung which persist a few months and are then completely resorbed and the lesion is not transmissible in series.

In spite of his experiments it nevertheless seems wise at present to be cautious in the use of the vaccine until the work has been confirmed independently by many competent observers. From recent work on virulent and avirulent forms of various bacteria (the "R" and "S" colonies), which change from one to the other form depending on the environmental conditions, such an attitude is not merely conservative but sane.

ARNOLD BRANCH

THE ACTION OF THE SALICYLATES

DR. P. J. HANZLIK, professor of pharmacology in Stanford University, California, has recently published a monograph on the action and uses of the salicylates in medicine. Not only has he collected all the evidence available from a bibliography of some 800 references, but has himself carried out extensive researches on the subject, and can therefore base his judgment on first hand knowledge. Nevertheless, the outstanding impression left after a study of what he has written is that we really know very little regarding the action of these drugs. Professor Hanzlik states that the administration of sodium bicarbonate with full doses of salicylates does not appear in any way to influence their toxic action, and he considers that this practice rests on tradition rather than on reason. While the action of salicylates in relieving the symptoms of rheumatic fever is one of the most striking therapeutic effects to be seen in a hospital ward, yet it is evident that we know nothing of the way in which this effect is produced. Hanzlik is emphatic that it is not a specific action, and states that apparently the relief of rheumatic fever by salicyl and cinchophen is obtained through the antipyresis and analgesia produced by these agents, thus securing for the patient comfort and rest, while the joint symptoms disappear spontaneously and gradually. Nevertheless, Hanzlik's statements do not carry us far, as we do not know exactly the mode in which these drugs exert their antipyretic and analgesic action. Unfortunately the more important action of the salicylates cannot be tested by animal experiments and will have to be solved by the more delicate method of clinical observation. These conclusions and explanations of Hanzlik will be received by clinicians with some hesitation for they recognize that not only are these drugs our chief remedy in acute rheumatism, but also in chronic muscular rheumatism they are undoubtedly among the most valuable drugs we possess and apparently not only relieve the pain, but actually modify the faulty conditions.

THE ALUMNI ASSOCIATION OF THE UNIVERSITY OF WESTERN ONTARIO ESTABLISH A PRECEDENT

THE Alumni Association of University of Western Ontario Medical School has established a precedent among Canadian Universities, by presenting to this year's graduating class, membership in the Canadian Medical Association, which carries with it the *Journal*. This should be advantageous to all concerned: the Alumni Associ-

ation, the graduates, and Canadian medicine. Those who have had experience in organizing graduates, appreciate the fact that considerable effort and propaganda are required to maintain interest in their Alma Mater. A practical gift, such as the *Canadian Medical Association Journal*, from the Alumni to the graduates at the time when their financial circulation is in a condition of "ebb and flow," will materially strengthen the bond between them and their Alumni Association, and should lessen the work of organization in later years.

The interne service in Canadian hospitals could be made more attractive if there were arranged for the internes, definite courses of instruction, ward rounds, and clinical pathological conferences. A fairly high percentage of the recent graduates seek interneships in the United States and too often they remain in the city where they have already become known to the profession. The *Journal* by its monthly visit will remind these graduates of the progress of Canadian medicine, and may be one of the factors in inducing them to return. Membership for one year in the Canadian Medical Association should make it easy for the graduate to become permanently a member of the Association.

GRADUATES ESTABLISH ENDOWMENT FUND FOR ALMA MATER

EACH member of this year's graduating class of the University of Western Ontario Medical School insured his life for $500.00 and made the Board of Governors the beneficiary. The funds which accrue are to be used as an Endowment Fund for the Medical School. This seems to be the first instance among Canadian Universities where an appreciation of their Alma Mater has taken this particular form.

Editorial Comments

We are pleased to note that at a meeting of the Medical Society of London held on March 28, 1927, Professor Irving H. Cameron, Toronto, was elected an Honorary Fellow.

Meeting of the American Association for the Feeble Minded

We have pleasure in calling attention to the fact that the annual session of the American Association for the Study of the Feeble-minded will take place in Laconia, N.H., on the 4th, 5th and 6th instant. Papers will be presented on the medical and psychological aspects of mental deficiency, on social science as applied to mental deficiency, on education as related to mental deficiency, and on criminology as related to mental deficiency. All who are interested in this very important subject will be made most welcome, and we will be very glad to call attention in the *Journal* to the most important facts brought out at the meeting.

New Conceptions on the Development of Immunity

New conceptions of how immunity is developed against germ-caused infections, that may have far-reaching effects on the protection of the human race against disease, were reported to the American Society of Bacteriologists by Dr. Philip Hadley, of the University of Michigan. (*Science Supplement*, April 1, 1927). According to the older views it was thought that all the bacteria of a particular specific kind must necessarily be alike in all their characteristics. Recent work, however, has shown, said Dr. Hadley, that "in one and the same bacterial culture organisms of vastly different potentialities for disease production may exist side by side." At present, many disease-producing species may be divided into two distinct types; one that is virulent and possesses certain individual properties and is called the "S type"; and another that is non-virulent, or at least less virulent, and possesses other characteristics, and is known as the "R type." The most important difference between the two types lies in the fact that the "S" form resists the onslaughts of the defensive cells of the blood known as the phagocytes, while the other form is readily destroyed by them. Change from one form to the other may be produced artificially in test tubes in the laboratory, Dr. Hadley stated. The most potent factor in inciting such changes has been

found to be blood or serum from an animal which has been inoculated with the culture of the organism in question. In the presence of such serum the virulent form "S" passes over into the non-virulent form "R." The importance of being able to bring about such an action in the bodies of animals and human beings suffering from bacterial infection is at once apparent.

The Danger of Irradiating Foods

Warnings have recently been given against widespread routine irradiation of milk by ultra-violet rays. Milk that has been exposed to the radiation of a mercury vapour lamp for as short a time as five minutes not only becomes unpalatable in that it acquires an unpleasant, tallowy odour, but suffers chemical changes highly undesirable. Of these one is the destruction of vitamine A by oxidation. The use of such a deteriorated product might lead to a shortage of vitamine A in children dependent on milk. Considerable experimental work remains to be carried out before the conditions have been determined under which so complex a food stuff as milk can be subjected to the powerful action of ultra violet or other irradiation without serious impairment of nutritive value.

The *Lancet* in a recent issue calls attention to the fact that two years ago the Royal College of Physicians of London made an appeal for the rebuilding of the tower of Hempstead Church in Essex where lies the body of William Harvey. A marble sarcophagus had been provided by the College in 1883 shortly after the old battlemented tower with its firebells had fallen to the ground. The appeal was directed to medical men of all nations to erect in this way a tangible memorial of one of the great men of their profession. The probable cost was estimated at £5,000 of which about one-fifth has been already contributed.

It was resolved to keep the fund open in the hope of receiving further support. Subscriptions may be sent to Dr. Sydney Phillips, Royal College of Physicians, London, Pall Mall East, S.W.—1.

In the report of the Medical Research Council of Great Britain, *Lancet*, March 5, 1927, the following report is made regarding the Dick test for scarlet fever immunity::

At the City Bacteriological Laboratory in Birmingham Dr. H. Henry and Dr. F. C. Lewis have continued their researches into scarlet fever immunity.

By using susceptible human volunteers they have been able to titrate a measured amount of scarlet fever toxin against varying amounts of serum taken from children who have not had scarlet fever and also from those who are convalescent from the disease, and, by this method, have succeeded in showing that an attack of scarlet fever usually results in an immunity of which the degree can be measured in terms of antitoxin units.

It has also been discovered that a small percentage of young children have notable quantities of antitoxin in their blood, without any other evidence of any previous attack of the disease. The deduction is that these children must have passed through an attack of the disease in a form not recognized clinically. Since most adults are resistant to the Dick test and also show relatively large amounts of the same antitoxin in their circulating blood without any history of an attack of the disease, a strong suggestion arises that scarlet fever as the clinicians see it may exhibit only a small percentage of a widespread infection which at present escapes detection.

Dr. Henry and Dr. Lewis have also made a series of experiments to determine the rise and fall of antitoxin production in convalescence from scarlet fever. At present their work is being directed to a satisfactory standardization of the Dick test and to an accurate definition of the antitoxin unit. In dealing with both these important problems they are acting in collaboration with members of the Council's staff at the National Institute.

We are very pleased to note that the second impression of the volume of the *Appreciations and Reminiscences of Sir William Osler*, edited and privately issued by Dr. Maude E. Abbott, is well reviewed and is in good demand. From a review which appears in the *Journal of Pathology and Bacteriology*, April, 1927, we quote the following: "The volume is of quite extraordinary charm. Planned as a collection of reminiscences of Osler's interest in medical museums, and in the place where he first exploited his belief in morbid anatomy it soon grew beyond its original design, and under the loving care of Dr. Abbott about a hundred and twenty people have written something of what they knew of Osler, and of what he stood for to them. Osler's first published paper is reproduced in facsimile. It is an account of microscopic pond life in spring in Canada, and was a fit beginning for one who was pre-eminently a natural historian of human disease, rather than an analytical experimenter."

Post-Graduate Tour to America

A post-graduate tour in Canada and the United States of America is being arranged by the Section of Surgery of the Royal Society of

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Medicine. Starting from Southampton on August 20th, Quebec will be reached on August 28th, and the following towns will be visited: Montreal, Ottawa, Toronto, Chicago, Rochester, Grand Rapids, Ann Arbor, Detroit, Cleveland, Washington, Baltimore, Philadelphia, New York, and Boston. On the return journey the party will sail from New York on September 24th, Plymouth being reached on October 2nd. The estimated minimum cost of the tour is £138, together with about £25 for out-of-pocket expenses. Fellows of the society other than members of the Surgical Section can join the tour on being nominated by the Tour Committee, but members of the medical profession who are not Fellows of the society, and who wish to accompany the party, must be nominated by two members of the Surgical Section.

We learn that the Desert Sanatorium of Southern Arizona has begun additional construction which will triple the present capacity of the institution. This in itself is no small development of an institution of this sort, but when it is also remembered that the institution only opened its doors in November last, this rate of growth and the demand for space in it is of a very striking nature.

The Sanatorium owes its being and its continued expansion largely to the vision and work of Dr. Bernard Wyatt, who has given up his private practice and will devote all his time to the institution and consultant work.

We have received two further communications on the subject of coronary thrombosis. We reget that owing to press of other material and the late date at which they were received, we are unable to publish them this month. The subject is one of great importance and demands the attention of the profession more than it has apparently received. The papers will appear in our July number.

Ultraviolet Radiation and its Transmission by Various Substances. — Charles Sheard, Rochester, Minn., discusses the approximate limits of various regions of radiant energy, ultraviolet radiation more particularly, the transmission of ultraviolet radiation by various substances, the transmission of radiant energy (visible and ultraviolet) of various wave lengths by vitaglass and window glass, and the so-called cloth glasses, consisting of various cloths treated with paraffin and wire-mesh screens filled with celluloidinous material. The latter transmit the ultraviolet and visible radiations very well, being superior in these particulars to the ultraviolet transmitting glasses (such as vitaglass) now on the market, but all so-called cloth glasses (paraffin) or wire-mesh screen glass (celluloidinous material) are, to a certain extent, fire hazards in that if once ignited they will be destroyed rapidly. Sheard says that paraffin and celluloid do not in any wise increase the transmission of ultraviolet through the cloth or through the wire-mesh materials: the pores of these materials will do that far better. But the addition of sufficiently thin layers of paraffin or celluloid permits reasonably good transmission of the whole of outdoor sunlight, as well as affording protection and providing shelter. The same comment may be made with reference to various cloths coming on the market which are said to transmit "the health-giving rays of the sunshine." It is obvious that direct exposure of the body would be the most efficacious procedure and that next best would be very thin porous materials, since the more holes there are and the larger they are the greater will be the exposure to radiation. It seems possible that either glasses transmitting the whole of sunlight, or the cheaper substitutes in the form of thin paraffin and celluloid materials, may be used advantageously in solariums and living rooms by those who winter in northern climates and who spend, for one reason or another, the bulk of their waking hours behind glass windows. In the summer time (July) the ultraviolet content of sunlight is at its maximal value. At that time the intensity of the ultraviolet portion of solar radiation is about equal to that of the sun's infra-red (heat) rays. In the months of December and January the ultraviolet content of sunlight reaches its lowest value, or less than 5 per cent of its maximal value in July. In the summer months everybody gets outdoors, each somewhat in proportion to his remoteness from the bread-and-butter line or to the impelling, on-driving forces of modern life, unless perhaps he is fortunate enough to have an outdoor job. Tanning of the skin occurs in summer by reason of the ultraviolet rays; this tanning disappears in large measure in the winter time because of a lack of both ultraviolet radiation and exposure to such as does exist. Doubtless all of the tanning and other physiologic reactions take place in accordance with the law of supply and demand. In the summer time there is a surfeit of ultraviolet radiation. In the winter time there is a dearth of sunshine and of the ultraviolet rays, in particular, and civilized man wraps himself in woolens, stays indoors, and sits behind the panes of window glass which rob him of the ultraviolet of the sunshine.—*J. Am. M. Ass.*, April 23, 1927.

Men and Books

INDIAN MEDICINE

By H. H. Murphy, B.A., M.D., C.M.

Kamloops, B.C.

Many years ago, in his essay on the North American savages, Dr. Benjamin Franklin wrote:—

> "Savages, we call them, because their manners differ from ours, which we think the perfection of civility—they think the same of theirs. Perhaps if we would examine the manners of different nations with impartiality we should find no people so rude as to be without politeness, nor any so polite as not to have some remains of rudeness."

Is this statement not true of much more than manners? No nation and no people has ever grasped eternal truth in all its completeness, nor have we to-day. Although in science, in medicine, in every department of knowledge, our workers are slowly extending the field of the known, yet we must be ever ready to admit that our knowledge to-day is an inheritance from the past, which we are privileged to use only on condition that we pass on that inheritance to posterity enriched and broadened and verified by our experience.

Medicine to-day recognizes that primitive Indian medicine of this continent has given us cocoa, sarsaparilla, jalap, cinchona and guaiacum; remedies that have stood the scientific test of the 20th century even as they proved their worth to the Indian shaman or medicine man. Remember always that in primitive Indian medicine of this continent, the grain of truth is obscured and hidden by many a childish belief and superstition, but that the grain of truth is there, I think, is unmistakable.

The Indians of North America looked on disease as did the Chaldeans, the Assyrians, the Hebrews, the Greeks and the Romans. They all saw in illness the outward and visible signs of a powerful demon or evil spirit who must be placated, so that the "spiritual" side of medicine was perhaps more emphasized then than it is to-day.

The Shaman was chosen in various ways. Amongst the Peruvians, a man who had been struck by lightning or who has suddenly gone crazy was considered eligible for the cult, and I am sure that many of us, in moments of depression, when we have reached the limit of our art and are learning again, as we have learned so many times before: "Thus far shalt thou go and no further"; at such times I think we all have wondered if our "call" was not of a similar character. Amongst many tribes, such as the Cherokees, the custom was to dedicate a family to the healing art even as the family of Levi was consecrated to the priesthood. Amongst the Apaches, any man could attempt to alleviate sickness in a family; any man could become a Shaman, if he were willing to chance the punishment that followed failure to cure, but he must be a dreamer and be able to convince others of his spirituality; or (and note this) he must seek tuition under another Shaman, study for a year or more and pay his tuition fees. And (mark again) the Eskimos and Dakotas had medicine women as well as medicine men.

The medicine lodges were known as "homes of mercy" and amongst the Apache, the Sioux and the Cheyenne, afforded sanctuary to fugitives. Our President has, I know, recently been studying the right of sanctuary in the British Isles, and I would ask him to note the progressiveness of the Indian tribes on this point. To-day, when everyone has a Freudian complex, and psychoanalysis is slowly but surely establishing that it also carries some pure gold, it is interesting to note that in some cases, the patient confessed to the medicine man before healing could occur. Then, as now, the medicine man did not attend illness in his own family, but he was more fortunate than we, for he very rarely had to assist in childbirth.

The Indians of Vancouver Island believed pulmonary tuberculosis to be due to the swallowing of a lizard and the victim of this disease had rude carvings of lizards on his tomb. These you can see in the Indian burial ground near Sidney. To-day we know tuberculosis to be due to the taking into our system not a lizard but the tubercle bacillus; but who can say that the Indians had not a glimpse of the truth?

The sweat bath was used almost universally by the Indians of this continent both for purposes of cleanliness and for the treatment of disease. The Okanagan and Shuswap Indians took a cold bath after each sweat bath; the Nicola band washed in cold water first.

The Indians were dexterous in the making and use of splints for fractures, and they were very successful in treating gunshot wounds, which they dressed less frequently than we do. They recognized that disease could be cured by natural agents. Scarification was commonly used and the medicine man of Florida applied hot stones to the abdomen for pain; the Thompson Indians used hot fir branches, or skins filled with hot ashes.

In these days of organotherapy, when every pharmaceutical house is marketing a new tablet of almost every organ in the body—a field in

medicine which is as little known as Africa was before Stanley—we can at least look sympathetically on the Thompson Indians treating sudden pain with a drink of water in which beaver's testicles had been soaked. The testicles were afterwards dried and kept for further use. The value of bone marrow was equally well known to this tribe of Indians for they broke up the large bones of all carcasses which had been eaten, melted the marrow and stored it in a deer or elk's bladder.

Pain in joints was treated by scarification, by counter-irritation and cauterization produced by blowing charcoal dust over the affected part and then igniting it. I have seen lumbago treated by thrusting hot needles into the lumbar muscles—the Thompson Indians often treated a painful joint by thrusting in long sharp awls.

I shall not refer at length to many interesting customs connected with childbirth, but I would have you note that the Lilloet band insisted on the need of absolute quiet at this time; the naval string was cut and tied with hair of a squirrel or hare or Indian hemp bark and smeared with black pine gum. You will remember that amongst the Hebrews the period of purification lasted from 40 to 80 days depending on the sex of the child. Amongst the Thompson Indians, the period was from 6 to 12 weeks.

The treatment for snake bite in this district had a real value; one or two wet buckskin strings, to which was attached the head of a weasel or ermine, were tied very tightly just above the wound. When the region was swollen almost to bursting, they were unfastened and tied again tightly, four inches higher up. The wound was cut, burned and sucked, herbs rubbed in, and an incantation was made by a Shaman who had the rattlesnake for his guardian spirit.

An Indian who had eaten too much knew that easy relief could be secured by tickling the throat with a feather. Amongst the Zuni, a type of stomach lavage for dyspepsia was practised. The patient took a copious draught of warm water and then stuck his fingers down his throat. The Lilloet Indians were more dainty and used a stomach stick instead of the finger. Amongst our local Indians, decoctions of soapberry (Shepherdia Canadensis) was used as a purgative and for purification in the sweat houses. A decoction of sage brush was likewise used in the sweat houses and the leaves placed in the nostrils for a cold. For flatulence, hot water and powdered charcoal were found as beneficial as we find the same remedy to-day.

Many tribes understood emetics, cathartics and sudorifics, but although I find no mention of the Shuswap Indians using the very valuable cascara bark which is found on Shuswap Lake, I venture to think that they did know about it. During our influenza epidemics, how many children have to wear some asafoetida in a bag suspended around their necks. The Indian children were much more fortunate—they had to carry only hoddentin—the powder or pollen of a form of cat-tail. The Cherokees used black snake root for toothache and for cold in the head. It is still considered of some value. Wild senna was used for fevers and it is in use to-day as a laxative. Maiden hair fern, wild alum, gillenia trifoliata (Indian physic) and liverwort were all correctly used.

They had few surgical instruments but were able to give an injection by the use of a bladder and the hollow bone from a fowl's leg. They were able to trephine the skull with the aid of a stone. The Indians of the plains did wet cupping, scarifying with a sharp stone and using a buffalo horn as a cupping glass. Boils were opened and drained by means of a porcupine quill. Corneal opacities were removed by touching the eyeball with the *charred* (sterilized?) rough bone of a black bear. The skin forming the opacity was caught by bone, raised and cut with a sharp knife. Warts were cut off close to the skin, and dressed with black moss heated before the fire; possibly sterilized in this way. Only during the Great War did we re-learn the value of moss as a surgical dressing.

In matters of hygiene the untutored Indian did not too badly. He did not have an individual drinking cup, but he had a drinking tube made from the leg bone of a crane, goose or swan. He did not have Shamrock brand lard, nor Swift's Premium Bacon, but he dried his game and fish in the sun or before a fire. He smoked it and stored it in a deerskin sack. He extracted the oil from his fish and stored it in an elk's bladder. He did not have sun dried raisins, but he had sun dried cherries, raspberries and soapberries, and had all the experimental work done along these lines some time before the California packing corporations commenced to advertise. The Indian was particular about his dress; he wore his hair long, and if he thought this style unbecoming amongst his acquaintances, he scalped them. He started a habit peculiar to this continent—*i.e.*, chewing gum and Nature supplied him with tamarack gum for the purpose.

Like all primitive people, the Indian mixed up his theology with his medicine and the further we go back the more associated do they become. The Indian Shaman would have said a hearty amen to the prayer of Jesus the son of Sirach: "My son, in thy sickness be not negligent, but pray unto the Lord, and He shall heal thee. Put away wrong doing, and order thine hands aright. Cleanse thy heart from all manner of sin. Give a sweet savour and a memorial of fine flour; and make a fat offering as one that is not. Then

give place to the physician, for verily the Lord hath created him; and let him not go from thee, for thou hast need of him. There is a time when in their very hands is the issue for good. For they also shall beseech the Lord, that he may prosper them in giving relief and in healing for the maintenance of life. He that sinneth before his Maker, let him fall into the hands of the physician."

UNVEILING OF A TABLET TO SIR PATRICK MANSON

We note that a tablet to the late Sir Patrick Manson (1844-1922) has been placed in the ward of the Albert Dock Hospital in London, where Manson for a number of years practised and taught. The tablet bears the words, "Sir Patrick Manson, G.C.M.G., F.R.S., the Father of Tropical Medicine; Physician to this hospital." The tablet was unveiled by Mr. Nevile Chamberlain, the Minister of Health, who spoke as follows: "Of all the labourers in this field, Patrick Manson might truly be said to be the father. Born in Aberdeenshire and originally intended for engineering, he embraced medicine because prevented by physical weakness from following a more arduous profession. After graduation he obtained the post of medical officer for Formosa to the Chinese Imperial Maritime Customs. Here he remained for five years, leaving in 1871 to take up a practice in Amoy. He returned to England in 1899, and shortly afterwards was appointed as physician to the Albert Dock Hospital. On the year of his return to London the School of Tropical Medicine was opened. To his investigations we owe our knowledge in great measure of the *filaria sanguinis hominis* and much of our knowledge of the malarial parasite and the mosquito. Manson is universally recognized as a patient investigator who greatly enlarged our sphere of knowledge, and was an example to those who worked with him and under him for his gentlemanly conduct. His name will remain an inspiration to those who come after him, as one of our great Empire builders, not by reason of his conquest of other people, but by the victory he won over some of the most distressing plagues which afflicted mankind."

NOTES ON THE DEVELOPMENT OF ANÆSTHESIA IN WESTERN CANADA

By W. Webster, M.D., C.M.

Anæsthetist Winnipeg General Hospital
Winnipeg

It was evidently early recognized by those engaged in surgical work in Winnipeg, that skilful anæsthesia was a most important adjunct to its success and to their own peace of mind during the actual operation, for as early as 1899 we find recorded in the minutes of the Winnipeg General Hospital the appointment of Doctor Hutton as honorary anæsthetist. The position was held by Dr. Hutton until 1900. In 1901 Dr. Chestnut received the appointment, which he held until 1902. On his resignation the writer received the appointment which he has held to the present time.

In one's student days our only instruction consisted of a lecture on chloroform and ether from the professor of materia medica, in which it was insisted that chloroform was extremely dangerous in more than four per cent strength, though in 1897, when in England, I saw this anæsthetic given in at least one large hospital by Simpson's original method, viz. on a piece of lint folded into three or four layers. The patient's face was well covered with vaseline to prevent the action of the chloroform on the skin. Then one or two drams were poured on the lint and the latter applied closely to the victim's face, a method by which it has since been shown that as high a vapour content as thirteen per cent may be inhaled. The patient invariably struggled but willing hands of medical students were ready to control these natural efforts against the powerful fumes, and he speedily succumbed, the induction not lasting more than two or three minutes. The above does not, however, describe the usual condition of affairs. At that time the British Isles were probably more advanced in the specialty of anæsthesia than any other country. Hewitt, Buxton, and many others were devoting their whole time to this specialty, while a great deal of laboratory research was carried on with the object of discovering the cause of anæsthetic fatalities, means of preventing the same, and improvement in apparatus for administration. The Society of Anæsthetists had been formed in 1893 with F. Woodhouse Braine, F.R.C.S. as its first president; while at least a goodly number of medical schools gave instruction in anæsthesia to their students.

During the last two decades the United States has made the chief advance by the use of nitrous oxide anæsthesia. In that country apparatus for the administration of this gas has reached a higher degree of efficiency than elsewhere, for which we have to thank such men as McKesson, Heidbrink, Forreger, and others. The mechanical perfection of their machines has placed nitrous oxide on an altogether higher plane of usefulness to that formerly attained.

In western schools excepting for the two lectures referred to, the only knowledge the student could gain was by watching the anæsthetist, usually a house surgeon, in the operating room, where either chloroform given on an Esmarch's mask, or ether given by means of a Clover or Allis inhaler was used. About 1893 Dr. Hutton introduced a Junker's chloroform inhaler with which he administered many anæsthetics although it was not till later that he was officially ap-

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pointed honorary anæsthetist. There was undoubtedly a certain fascination in using these inhalers and watching the air bubble through the chloroform, and the little feather at the top of the facepiece rise and fall with the patient's respiration. We were inclined to regard it in those days as rather a scientific method of administration and I later on found it convenient for use in tonsillectomy and other mouth and nose operations; but about 1903 I devised an apparatus for vaporizing ether in the same manner, except that the ether bottle was placed in a tank of warm water to hasten the evaporation of the vapour. In lengthy operations the Junker bottle used to get quite cold owing to the evaporation of the chloroform, and as the method of holding it was to suspend it by the attached hook from the buttonhole in one's vest, or if wearing a gown, from a safety pin through the same, the bottle hanging against one's chest after a time took on the sensation of a lump of ice. In fact some anæsthetists actually developed a neuritis from this cause, and so were forced to hang the bottle on some other support. In obstetric cases the rail at the head of the bed formed a convenient place.

In Winnipeg, until 1904 there was no organized method of teaching students, but in that year the Dean of the Medical Faculty requested me to give a few lectures on anæsthetics, and I accordingly gave a course of four and the following year, 1905, I was appointed to a chair in the Faculty as lecturer on Anæsthesia. In that year and for a few succeeding years the course adopted was the one which prevailed in Edinburgh at that time, viz., that each fourth year student attended four didactic lectures and 20 cases of anæsthesia in the operating room. Earlier in his medical studies he also had the opportunity of anæsthetizing animals during the course in practical physiology.

A gradual increase in the work done by the student has been demanded so that now he receives eight didactic lectures in anæsthesia, and spends two and a half weeks in the operating room where he is taught the practical side of the subject for five to six hours each day and administers anæsthetics under supervision. In his fifth year he spends two months as assistant in anæsthesia. At the end of the fourth year he is subjected to an examination in which 40 per cent of the marks are allotted to the manner in which he has conducted himself, and the aptitude shown by him in his practical work during the time spent in the operating room.

For several years prior to 1912 Dr. J. W. Thomson held the position of anæsthetist at Vancouver General Hospital. In that year Dr. C. H. Bastin was appointed and was chief until about 1920 when he was compelled to retire from full time work in this specialty on account of his health. Dr. Freeze, this year president of the Canadian Society of Anæsthetists has directed the department since 1920.

For some years other western cities, Edmonton, Calgary, and other hospital centres have seen the necessity for employing specialists in this art, and it is confidently anticipated that before long all the Western cities and towns of sufficient size will contain at least one graduate in medicine specializing in anæsthesia.

The Production and Consumption of Dangerous Drugs.—The Advisory Committee of the League of Nations, which deals with the traffic in opium and other dangerous drugs, has recently issued a summary of annual reports for the years 1924 and 1925 received from various countries and mandated territories. In the case of Germany it appears that 152,000 kilograms of opium were imported in 1925 and some 14,000 kilograms of morphine were manufactured, of which 4.642 kilograms were exported. In Great Britain, in the same year, 68,541 kilograms (150,806 lb.) of raw opium were imported, and the novel feature recorded is that no less than 52,722 kilograms (116,000 lb.) of the total import came from India. Persian opium has almost ceased to be imported, and Turkish opium is falling off. Although Indian opium only contains 9.07 per cent of morphine as against 11.03 per cent in the Turkish drug, it is nevertheless found to be commercially a profitable source of the alkaloid. British exports of morphine in 1925 amounted to 95,295 ounces (2,706 kilograms), showing a considerable increase on the previous year. It is reported from Hong-Kong that 11 per cent of the total revenue of the colony is derived from opium, that 41,600 lb. of raw opium and 28,000 lb. of opium "prepared" for smoking were imported, during 1925, from India. In Iraq the sale of opium has become a Government monopoly. In the case of the United States 100,478 lb. (45,667 kilograms) of raw opium were imported in 1925 from Turkey, Greece, and England; 105,689 ounces (3,001 kilograms) of morphine were manufactured, nearly all of which was used for home consumption. It is stated that no heroin was produced during the year, as its manufacture is now forbidden by the Federal Narcotics Contral Board, but 154 kilograms of the alkaloid were sold in 1925. In 1924 the area under cultivation for the opium poppy in India was 54,708 hectares. The consumption of opium "prepared" for smoking in the years 1920-24 appears from the statistics to be enormous in Burma, Formosa, French Indo-China, Hong-Kong, Malaya, the Netherlands Indies, and Siam.—*Brit. M. J.*, May 14, 1927.

Association Notes

Programme

THE FIFTY-EIGHTH ANNUAL MEETING OF THE CANADIAN MEDICAL ASSOCIATION TO BE HELD IN TORONTO ON JUNE 13, 14, 15, 16, 17, 18, 1927

In Conjunction With

The Ontario Medical Association
The Canadian Public Health Association
The Canadian Tuberculosis Association
The Canadian Society of Anæsthetists
The Canadian Radiological Society
The Ontario Radiological Society

HEADQUARTERS—THE UNIVERSITY BUILDINGS

Registration will commence at nine o'clock on the morning of Monday, June 13th, in the Exhibition Hall, University College, and will continue throughout the week.

The first two and one half days of the week are largely devoted to the Business Sessions of the various Associations. The Scientific Programme commences with the afternoon session of Wednesday, June 15th.

An examination of the programme herewith presented, will disclose the fact that talent of a very high order has been secured for the meetings.

Particular attention is directed to the announcements from the various Committees, all having to deal with the general arrangements for the meeting, looking to the comfort and happiness of the members and their friends.

SKELETON PROGRAMME

Monday, June 13th

Daylight saving time.

10.00 a.m.—Meeting of Canadian Medical Association Council. *Hart House.*

1.00 p.m.—Council luncheon, as guests of the President-elect, Dr. F. N. G. Starr. *Hart House.*

2.15 p.m.—Meeting of Canadian Medical Association Council. *Hart House.*

7.00 p.m.—Council will be dinner guests of the Academy of Medicine, Toronto. *Academy of Medicine.*

7.00 p.m.—Annual Dinner Meeting Canadian Tuberculosis Association. *Christie St. Military Hospital.*

Tuesday, June 14th

9.30 a.m.—Meeting of Canadian Medical Association Council. *Hart House.*

9.30 a.m.—Meeting of Canadian Tuberculosis Association with Medical Staff of Department of Soldiers' Civil Re-establishment. *Christie St. Military Hospital.*

1.00 p.m.—Council luncheon, as guests of the Chairman of Council, Dr. A. Primrose. *Hart House.*

2.00 p.m.—Meeting of the Committee on General Purposes of the Ontario Medical Association. *Osler Hall, Academy of Medicine.*

6.00 p.m.—Meeting of Nominating Committee of Ontario Medical Association. *Osler Hall, Academy of Medicine.*

7.00 p.m.—The Ontario Medical Association annual dinner and round table evening; guests—the members of the Canadian Medical Association Council. The programme will be in charge of the Committee on Inter-Relations of the Ontario Medical Association. *Hart House.*

8.15 p.m.—Annual Meeting, Canadian Public Health Association. *Physics Building, University of Toronto.*

Wednesday, June 15th

9.00 a.m.—Clinics will be arranged in the various hospitals (See Bulletin Boards.)

9.30 a.m.—Meeting of Canadian Medical Association Council. *Hart House.*

12.30 p.m.—Luncheon, and formal opening of the convention. *Hart House.*

2.00 p.m.—Report of Nominating Committee Ontario Medical Association.
General Session in Convocation Hall.

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4.30 p.m.—Garden Party at Government House, Chorley Park, guests of His Honour the Lieutenant-Governor of Ontario, and Mrs. William Donald Ross.

7.45 p.m.—The annual Dinner—*Hart House.*

Thursday, June 16th

9.00 a.m.—Sectional meetings.

2.00 p.m.—General Session—*Convocation Hall.*

4.30 p.m.—Garden Party at "Donalda," and inspection of Model Farm, guests of Mrs. D. A. Dunlap.

Thursday night—Alumni Dinners and Class Reunions. *Note*: In order that these may be posted on the Bulletin Board, please notify the General Secretary.

Friday, June 17th

9.00 a.m.—Sectional meetings.

2.00 p.m.—General Session—*Convocation Hall.*

4.00 p.m.—Drive to University Farm, transportation and afternoon tea, guests of the Connaught Laboratories.

8.30 p.m.—Second Listerian Oration, (*Convocation Hall*) delivered by Professor Sir Charles Scott Sherrington, O. M., G.B.E., M.A., M.D., D.Sc., P. P.R.S., F.R.C.P., F.R.C.S., LL.D.

Saturday, June 18th

9.00 a.m.—The various Sections are arranging clinics, ward rounds, etc., in the several hospitals, at which distinguished visitors will take part. Full particulars will be found on the Bulletin Boards, *University College.*

GENERAL SESSIONS

Place of Meeting—Convocation Hall

Wednesday, June 15th
2.00 p.m.

Lesions of the arteries of the extremities.
Dr. Dean Lewis, Baltimore.

Post-partum care.
Dr. B. P. Watson, New York.

Eczema in infants and children.
Dr. C. G. Kerley, New York.

Septic infections of the bronchi.
Dr. D. A. Stewart, Ninette.

Thursday, June 16th
2.00 p.m.

Otolaryngology and the general practitioner.
Dr. G. E. Shambaugh, Chicago.

The myocardium.
Dr. J. Strickland Goodall, M.R.C.P., F.R.C.S., F.R.C.E., London, England.

Primary tumours of the lung.
Dr. Oskar Klotz, Toronto.

Radiological aspect of neoplasms in the lung.
Dr. W. A. Evans, Detroit.

Maternal mortality.
Dr. Helen MacMurchy, Ottawa.

Friday, June 17th
2.00 p.m.

Symposium on the gall bladder.

Radiology —Dr. Evarts Graham, St. Louis.

Pathology —Dr. Wm. Boyd, Winnipeg.

Medicine —Dr. Thomas McCrae, Philadelphia.

Anæsthesia—Dr. Wesley Bourne, Montreal.

Surgery —Dr. Charles Gordon Heyd, New York.

PROGRAMME FOR SECTIONAL MEETINGS

Section of Anæsthesia of the Canadian Medical Association, meeting with the Canadian Society of Anæsthetists

Place of Meeting.—Room 12, University College.

Wednesday, June 15th

9.00 a.m.—Address of Welcome.
Dr. A. J. Mackenzie, President of the Academy of Medicine, Toronto, 1926–27.

Presidential address.
Dr. D. D. Freeze, Vancouver.

Indications for intratracheal anæsthesia.
Dr. C. C. Stewart, Montreal.

Post-anæsthetic anoxemias.
Dr. John H. Evans, Buffalo.

Effect of anæsthetics on the body as a whole.
Dr. Wm. Webster, Winnipeg.

2.00 p.m.—Session to be held at Department of Pharmacology. *Medical Building.*

Anæsthesia in thyroid surgery.
Dr. Thomas Hanley, Toronto.

Demonstration by
Dr. W. Easson Brown, Toronto.

Thursday, June 16th

9.00 a.m.—Hospital clinics—Demonstration of various types of anæsthesia.
(A Bulletin of operations and types of anæsthesia to be demonstrated, will be issued).

2.00 p.m.—Some points concerning the training of anæsthetists.
Dr. A. L. Flemming, Bristol, Eng.

Consumption of oxygen in health, disease and anæsthesia.
Dr. Allan Rowe, Boston.

The surgeon and the anæsthetist.
Dr. A. Primrose, Toronto.

The chemical basis of the efficiency and toxicity of local anæsthetics.
Dr. John S. Lundy and Arnold Osterberg, Ph.D., Rochester, Minn.

Friday, June 17th

Place of Meeting—Room 19, University College

9.00 a.m.—Carbon dioxide—its place in anæsthetic technique.
Dr. R. M. Waters, Kansas City.

The application of gaseous anæsthetics in unusual types of operations and in patients with unusual complications.
Dr. E. I. McKesson, Toledo.

Studies in the intoxication of ether nitrous-oxide, acetylene, propylene, ethylene, and chloroform anæsthesia.
Dr. V. E. Henderson, Toronto.

Observations on some current advances in anæsthesia.
Dr. F. H. McMechan, Avon Lake, Ohio.

2.00 p.m.—Combined meeting with the Canadian Medical Association.
Symposium on the Gall Bladder.
Dr. Wesley Bourne, Montreal, will deal with the subject from the viewpoint of the anæsthetist.

Saturday, June 18th

9.00 a.m.—Demonstrations of various types of anæsthesia at the hospitals. Bulletin will give definite information. See Bulletin Boards, University College.

EYE, EAR, NOSE AND THROAT SECTION

Place of Meeting—Room 12, University College.

Thursday, June 16th

9.00 a.m.—Methyl alcohol amblyopia.
Dr. Alex. E. MacDonald, Toronto.

High lights in the progress of ophthalmology during the last twenty-five years.
Dr. George S. Derby, Boston.

Discussion on "The inter-relationship between pathological conditions of the eye, and the nose and throat, embracing headaches, focal infections and acute swellings of the eyelids."
(Different aspects of the above will be the subject of short talks by selected speakers).
Discussion opened by
Dr. G. E. Schambaugh, Chicago.

Hearing and its preservation.
A short paper will be presented, the discussion will be opened by
Dr. G. E. Schambaugh, Chicago.

12.30 p.m.—Luncheon—The out of town specialists in Eye, Ear, Nose and Throat, will be the guests of the Toronto specialists.

Friday, June 17th

Place of Meeting—Room 12 and Croft Room, University College.

9.00 a.m.—Demonstration of interesting clinical cases. (Croft Room).
(A limited number of interesting clinical cases, with properly worked up histories will be seated in specially arranged booths in a room alongside the lecture room).

10.30 a.m.—Tuberculosis of the upper respiratory tract.
Dr. R. S. Pentecost, Toronto.

11.00 a.m.—Discussion on Dr. Pentecost's paper and on the clinical cases.

SECTION OF MEDICINE

Place of Meeting—Room 37, University College.

Thursday, June 16th

9.00 a.m.—Eczema.
Dr. Harold Orr, Edmonton.

Certain distinct types of renal disease and their treatment.
Dr. Norman M. Keith, Rochester, Minn.

The use and interpretation of blood chemistry by the general practitioner.
Dr. E. H. Mason, Montreal.

The examination of the nervous system.
Dr. Frederic Brodie, Vancouver.

The heart in goitre cases.
Dr. John Oille, Toronto.

Friday, June 17th

9.00 a.m.—Acute rheumatic fever.
Dr. A. H. Gordon, Montreal.

Pernicious Anæmia.
Dr. F. J. H. Campbell, London.

Duodenal ulcer.
Dr. C. S. McVicar, Rochester, Minn.

Asthma.
Dr. W. T. Connell, Kingston.

Angina pectoris.
Dr. G. R. Brow, Montreal.

Saturday, June 18th

Clinics will be held in the various hospitals. Among the speakers will be Dr. Thomas McCrae of Philadelphia and Dr. Charles F. Martin of Montreal.

SECTION OF OBSTETRICS AND GYNÆCOLOGY

Place of Meeting—Room 13, University College.

Thursday, June 16th

9.00 a.m.—Hæmorrhage in pregnancy.
Dr. John D. McQueen, Winnipeg.

Pyelitis in pregnancy.
Dr. L. C. Conn, Edmonton

Cancer of the Uterus.
Dr. R. N. Simpson, Winnipeg.

Pelvic inflammation.
Dr. J. S. McEachern, Calgary.

Pre-natal care.
Dr. J. W. Duncan, Montreal.

Description and Demonstration of Kieland Forceps.
Dr. W. R. Patterson, Toronto.

Friday, June 17th

9.00 a.m.—Fibroids.
Dr. F. B. Mowbray, Hamilton.

Management of certain obstetrical emergencies.
Dr. W. P. Tew, London.

Abortion.
Dr. Herbert Little, Montreal.
Dr. Eleanor Percival, Montreal.

Ectopic gestation.
Dr. John Fraser, Montreal.

Pregnancy and nephritis.
Professor V. J. Harding, Toronto.

Prolapsus uteri.
Dr. George Hooper, Ottawa.

SECTION OF PATHOLOGY AND BACTERIOLOGY

Place of Meeting—Pathological Laboratories—275 University Avenue

Thursday, June 16th

10.00 a.m.

The section of Pathology will hold its meeting this morning from 10 a.m. to 1 p.m., in the Pathological Laboratories of the University of Toronto, 275 University Avenue, South-west corner of Toronto General Hospital grounds.

Half-hour talks with demonstrations of pathological material will be given on the clinical subjects outlined below. These presentations will be made as practical and as interesting as possible, and their application to the problems of the general practitioner emphasized.

Each demonstration will be given twice in the morning, at the times specified. Members will have to choose the demonstrations preferred, as it will be impossible to attend them all.

At 10 a.m. and again at 11.30 a.m.

HAY FEVER—Dr. H. K. Detweiler.
"A brief discussion on etiology, methods of laboratory diagnosis and treatment."
Room No. 45

LEUKÆMIA—Drs. G. W. Lougheed and E. S. Jeffrey.
"A brief talk on the subject of leukæmia, with the presentation of a series of blood smears from interesting cases."
Room No. 29

DIABETES—Dr. Noble Sharpe.

"A clinico-pathological discussion with a laboratory demonstration of methods for estimating the sugar content of blood and urine."

Room No. 29

TUBERCULOSIS—Dr. I. H. Erb.

"A discussion of the pathology of tuberculosis in children with the presentation of some interesting pathological material."

Room No. 19

ENDOMETRIOSIS—Dr. J. W. Shirer.

"A discussion of dysmenorrhea, and its relation to the implants of endometrial tissue in the pelvic cavity."

Room No. 29

OTO-LARYNGOLOGICAL ABNORMALITIES—Dr. D. E. S. Wishart (10 a.m. only).

"A very interesting series of specimens will be shown illustrating various pathological conditions of the ear, nose and throat."

Room No. 10

At 10.30 and again at 12 a.m.

VOMITING OF PREGNANCY—Prof. V. J. Harding.

"Some factors in its causation: A demonstration of the laboratory control of treatment." Room No. 19

INFECTIOUS JAUNDICE—Dr. Gordon Cameron.

"A résumé of the clinical features of this disease with a demonstration of its relation to endemic leptospira infection in rats."

Room No. 38

LEAD POISONING—Dr. George Laughlen.

"A brief discussion on the symptomatology and treatment with a demonstration of blood smears from typical cases."

Room No. 29

BOVINE TUBERCULOSIS—Dr. R. M. P. Price.

"A discussion of the bovine types of infection in animals and their relationship to human infection with a demonstration of experimental production of bovine tuberculosis in animals." Room No. 33

EXPERIMENTAL TUMOUR PRODUCTION—Drs. W. B. Brebner and A. W. M. White.

"An outline of some recent work on the etiology of cancer with a demonstration of the experimental production of tumour growth in animals."

Room No. 32

At 11 a.m. and again at 12.30 a.m.

JAUNDICE—Dr. Wm. Magner.

"A discussion of the significance of jaundice with a demonstration of laboratory methods employed in its investigation."

Room No. 19

FOCAL INFECTIONS—Prof. W. L. Holman.

"What is meant by focal infection, its significance and importance in general practice and a demonstration of the bacteriology with resultant lesions in human cases."

Room No. 38

METABOLISM—Dr. W. R. Campbell.

"A brief outline as to what is meant by basal metabolic rate and the significance of a rise or lowering of this rate: The principles underlying the estimation of the basal metabolic rate will be given."

Room No. 41

FRACTURES—Dr. J. E. Bates.

"A very interesting series of slides will be shown illustrating the successive changes occurring in the healing of a fracture."

Room No. 29

TUMOURS OF THE EYE—Dr. Alexander MacDonald

"Diagnosis and treatment of tumours of the eye with a demonstration of various interesting types of tumours found in the orbit."

Room No. 10

INTRATRACHEAL INJECTION OF LIPIODOL—Dr. A. H. W. Caulfeild.

"A demonstration of the intratracheal injection of lipiodol by the supraglottic method, with a discussion of its diagnostic and therapeutic value." Room No. 29.

The Pathological Museum in this building will be open each day, from 9 a.m. to 5 p.m., to visiting physicians.

The pathological laboratories will also be open for inspection of routine work in pathology, bacteriology, serology, and chemistry.

SECTION OF PÆDIATRICS

Theatre Clinic—Hospital for Sick Children

By Members of the Staff

Wednesday, June 15th

9.00 a.m.—Treatment of eczema in infants.
Dr. G. E. Smith.

Quartz light therapy in pædiatrics—Treatment of rickets.
Dr. F. F. Tisdall.

Intravenous and interstitial therapy.
Dr. A. P. Hart.

Management of heart disease.
Dr. G. R. Pirie.

Management of diabetes.
Dr. Gladys Boyd.

Management of nephritis.
Dr. Gladys Boyd.

Management of marasmus or atrophy.
Dr. Alan Canfield.

Management of prematurity.
Dr. R. Simpson.

Management of malnutrition in older children.
Dr. G. A. Davis.

Treatment and prognosis of scarlet fever and diphtheria in private practice.
Dr. B. Hannah.

Diagnosis, prognosis and treatment of acute poliomyelitis.
Dr. G. Boyer.

Goitre.
Dr. M. A. Cox.

A general synopsis of each case or condition presented will be given to each member attending the clinic along with a brief résumé of the chief recent advances in each instance.

Thursday, June 16th

Place of Meeting—Room 6, University College.

9.00 a.m.—Diagnosis and treatment of enlarged thymus.
Dr. Howard Spohn, Vancouver.

Management of acute respiratory infections other than pneumonias.
Dr. Douglas Leitch, Edmonton.

Feeding problems in private practice.
Dr. Alton Goldbloom, Montreal.

Treatment of whooping cough.
Dr. R. R. Struthers, Montreal.

Acidosis and ketosis in children, practical consideration of.
Dr. Graham Ross, Montreal.

Results of the newer method of scarlet fever therapy.
Dr. H. B. Cushing, Montreal.

Intestinal grippe (so-called).
Dr. F. H. Boone, Hamilton.

Weaning problems.
Dr. Oswald Day, Winnipeg.

SECTION OF PUBLIC HEALTH

Place of Meeting—Room 11, University College.

Tuesday, June 14th

2.15–4.30 p.m.—Public Health Nurses' Section, Canadian Public Health Association.
Room 11, University College.

8.30 p.m.—Annual Meeting, Canadian Public Health Association.
Physics Building, University of Toronto.

Wednesday, June 15th

9.00 a.m.–12 noon—Public Health Nurses' Section, Canadian Public Health Association.
Room 11, University College.

Thursday, June 16th

9.00 a.m.—Types of clinical reactions following the injection of biological products
Dr. A. H. W. Caulfeild, Toronto.

Some aspects of physiological hygiene.
Dr. C. H. Best, Toronto.

Newer developments in the control of narcotic drugs.
Dr. J. A. Amyot, Ottawa.

The medical and legal aspects of drug addiction.
Dr. A. R. Richards, Burwash.

Immunization against diphtheria.
Dr. F. Adams, Windsor.

Periodic health examinations.
Dr. A. Grant Fleming, Montreal.

SECTION OF RADIOLOGY

Place of Meeting—Room 5, University College.

Thursday, June 16th

9.00 a.m.—Researches regarding the interpretation of the lesions in pulmonary tuberculosis as seen in x-ray films.
Dr. P. M. Andrus, London, Ont.

Radiological diagnosis of appendiceal disease.
Dr. W. H. McGuffin, Calgary.

Technique and results of cholecystography by the intravenous method—report of 160 cases operated upon.
Dr. James T. Case, Battle Creek, Mich.

The relation of sinus infections to respiratory diseases.
Dr. R. W. Knight, Brantford.

X-Ray diagnosis in anencephalus.
Dr. B. R. Mooney, Edmonton.

Roentgen-ray studies of dust inhalation.
Dr. G. C. Brink, Toronto

A case of recurrent sarcoma.
Dr. W. A. Wilkins, Montreal.

12.30–1.00 p.m.—Discussion.

Friday, June 17th

9.00 a.m.—Paper—title to be announced later.
Dr. R. Proctor, Edmonton.

The treatment of rodent ulcer—Analysis of cases treated from 1906 to 1926.
Dr. A. Howard Pirie, Montreal.

Investigations and conclusions in physical therapy.
Dr. L. K. Poyntz, Chicago.

Investigation of chest diseases by means of lipiodol.
Dr. L. R. Hess, Hamilton.

Some unusual diseases of the colon.
Dr. W. H. Dickson, Toronto.

Duodenal diverticula.
Dr. W. J. Cryderman, Toronto.

12.30–1.00 p.m.—Discussion.

Note:—Illuminating boxes will be provided for exhibiting films, and members are urged to bring interesting films for the general exhibit.

SECTION OF SURGERY

Place of Meeting—Room 8, University College.

Wednesday, June 15th

9.00 a.m.—Operations in all Toronto hospitals. (See Bulletin Boards).

Thursday, June 16th

9.00 a.m.—Obstructive lesions of the gastro-intestinal tract.
Dr. A. J. Grant, London, Ont.

Splenomegaly with report of two cases.
Dr. G. A. B. Addy, St. John.

Foot-ball injuries to the knee joint.
Dr. L. J. Austin, Kingston, and Dr. D. M. Campbell, Toronto.

Mechanical factors in infection of the renal pelvis and tubules.
Dr. D. W. MacKenzie, Montreal.

Some aspects of the problem of joint tuberculosis.
Dr. Russell A. Hibbs, New York.

Surgical treatment of tuberculous empyema.
Dr. Robert Janes. Toronto.

Friday, June 17th

9.00 a.m.—Mobility of the large bowel and its influence on health.
Dr. Andrew Croll, Saskatoon.

Post-operative ileus.
Dr. John A. Gunn, Winnipeg.

Inflammatory lesions of the thyroid gland.
Dr. E. M. Eberts, Montreal.

Disabilities of the shoulder region.
Dr. Alex. Gibson, Winnipeg.

Immediate and end results of suprapubic prostatectomy — Technique and pre- and post-operative care.
Dr. Verne C. Hunt, Rochester, Minn.

Papilloma of the intestines.
Dr. J. G. MacDougall, Halifax.

Saturday, June 18th

9.00 a.m.—Clinics and demonstrations in general surgery, orthopædics and genito-urinary surgery, at the following hospitals:

St. Michael's Hospital.

Toronto General Hospital.

Hospital for Sick Children.

Toronto Western Hospital, (by the combined staffs of Grace and Western.)

These clinics and demonstrations will be in charge of the staff of the respective hospitals. It is proposed to invite one or two visiting surgeons to be present at each of the hospitals to take part in the demonstrations and discussions.

IMPORTANT NOTICE TO ALL GOLFERS

CANADIAN MEDICAL ASSOCIATION CHALLENGE CUP

It is with pleasure that we announce a most interesting innovation at the annual meetings of the Canadian Medical Association. A golf tournament will be held on Tuesday, June 14th, play to take place throughout the entire day, over one of Toronto's interesting courses. A beautiful cup to be known as The Ontario Cup, has been graciously donated by the Ontario Medical Association. Other excellent prizes will be presented.

In order that the Committee in charge may make complete arrangements for the tournament, it is most important that all members of the Canadian Medical Association who desire to take part will communicate with the Chairman of the Committee, Dr. Dennis Jordan, 184 College Street, Toronto, not later than May 25th, 1927.

The Committee desires the following particulars:—

Name.....

Address.....

Name of Golf Club.....

Handicap.....

Complete details as to course, partner, time, etc., etc., will be supplied all players prior to the date of the tournament. If you intend to play, please communicate with the Golfing Committee at once.

Members will have the privilege of playing during the week at several of the Toronto Golf courses. Enquire at Information Office, University College.

TRANSPORTATION

Owing to the fact that a great many members of the Association will motor to the annual meeting, and also owing to the fact that those from a distance, by the use of summer tourist tickets, can get a much better rate than would be available if ordinary convention rates were used, it has been deemed advisable not to issue travelling certificates this year.

HOUSING

The Committee on Housing have made arrangements for two types of accommodation for guests attending the Fifty-Eighth Annual Meeting. The University of Toronto with its affiliated colleges has placed its residence accommodation at the disposal of the Association. In addition to this, limited hotel accommodation will be available. With reference to this latter type, the leading hotels are unable to promise to reserve single rooms during this session. Therefore, the hotel reservations must be for double rooms in the majority of instances.

The University residences which will be at our disposal will be the "Men's Residences" on Hoskin Avenue, the Residence, 73 St. George Street, and if needed, Trinity House and Burwash Hall. These will afford ample accommodation and will satisfy the requirements for single rooms.

Lady physicians and physicians accompanied by their wives, may be accommodated in the residence of St. Hilda's College, St. George Street.

The Warden of Hart House has consented to have breakfast served to the guests at a reasonable charge during the session. The charges for accommodation are shown in the following list:

UNIVERSITY OF TORONTO RESIDENCES:

1 to 4 days	$5.00
Each additional day	$1.00

KING EDWARD HOTEL:

*Single Room	$4.00
Double Room with Bath	7.00

PRINCE GEORGE HOTEL:

Double Room with running water	$3.00
Room with Bath	$4.00 to $6.00

WAVERLEY HOTEL:

*Single Room with running water	$2.00 to $2.50
*Single Room with Bath	$2.50 to $4.00
Double Room with running water	$3.50 to $4.00
Double Room with Bath	$4.00 to $7.00

QUEEN'S HOTEL:

*Single Room	$2.00 to $3.00
Double Room	$4.00 to $5.00
*Single Room with Bath	$3.00 to $4.50
Double Room with Bath	$5.50 to $7.00

WALKER HOUSE:

American Plan, room and meals.

$6.00 per day, per person, room with bath.
$5.00 " " " " " without bath.

European Plan, room only.

$3.50 per day, per person, room with bath.
$2.50 " " " " " without bath.

*A very limited number of single rooms will be available.

HOTEL CARLS-RITE:

American Plan.

$6.00 per day, per person, room with bath.
$5.00 " " " " " without bath.

European Plan.

$3.50 per day, per person, room with bath.
$2.50 " " " " " without bath.

It is requested that prospective guests make known their requirements by writing **not later than May 25th**, to Dr. Gordon S. Foulds, Secretary of the Housing Committee of the Association, at its offices, 184 College Street, Toronto 2, Ontario, **stating the type of accommodation desired and the number of days for which accommodation will be required.** The desirability of accommodation in the University Residences is obvious on account of the proximity of these buildings to the meeting places of the Association on the University Campus and the sociability found in this type of arrangement.

LADIES' PROGRAMME

Executive Committee

General Convener - MRS. F. N. G. STARR
Honorary Secretary - MRS. F. C. TREBILCOCK
Honorary Treasurer - MRS. W. B. HENDRY

Mrs. A. Primrose, Convener of Registration and Reception.

Mrs. C. H. Hair, Convener of Dinner.

Mrs. D. E. Robertson, Convener of Transportation.

Mrs. W. E. Gallie, Convener of Sports.

Mrs. W. B. Hendry, Convener of Thursday Evening Entertainment.

Mrs. Edgar Brandon, Representative of the Ontario Medical Association.

Mrs. A. J. MacKenzie, Representative of Academy of Medicine.

Dr. Florence McConney, Representative of Medical Alumnæ.

Mrs. J. G. Fitzgerald, Mrs. T. C. Routley, Mrs. George S. Young, Mrs. Gordon Bates.

Tuesday, June 14th

1.00 p.m.—Luncheon at the Granite Club for the wives of the visiting members of the Canadian Medical Association Council, and the wives of the visiting members of the Directorate of the Ontario Medical Association, guests of Mrs. F. N. G. Starr.

3.30 p.m.—Through the courtesy of Mr. A. E. Mathews, visiting ladies will be entertained on his yacht, "The Condor," to a trip on Lake Ontario.

8.30 p.m.—Musicale at "Wymilwood," 84 Queen's Park, for the visiting ladies, guests of Mrs. A. Primrose.

Wednesday, June 15th

4.30–6.00 p.m.—Entire Convention to be the guests at a Garden Party, of His Honour, the Lieutenant-Governor of Ontario, and Mrs. William Donald Ross, at Government House, Chorley Park.

7.45 p.m.—Annual Dinner—*Hart House*—reservations for which must be completed by 6.00 p.m.on Tuesday.

Thursday, June 16th

2.45 p.m.—Drive around the city for visiting ladies, leaving from University College, concluding with a

4.30 p.m.—Garden party at "Donalda Farm"—the entire Convention to be guests of Mrs. D. A. Dunlap. Motors will leave from University College.

8.00 p.m.—Informal reception at the Royal Canadian Yacht Club, for the visiting ladies who will be the guests of the Canadian Medical Association.

Friday, June 17th

10.30 a.m.—Golf tournament at Lambton Golf Club, followed by luncheon for the visiting players, guests of the Sports Committee.

4.00 p.m.—Drive to University Farm, transportation and afternoon tea, for the entire Convention, guests of Connaught Laboratories.

8.30 p.m.—Second Listerian Oration, delivered by Sir Charles Scott Sherrington, G.B.E., M.D., D.Sc., F.R.C.P., LL.D, Oxford, England.

There will be a one-day Golf Tournament for visiting ladies at the Lambton Golf Club, on Friday, June 17th, at 10:30 a.m. Contestants will meet the Golf Committee at the University Buildings at 10:00 a.m., and will be motored to the Club. There will be medal rounds on the long and short courses, with prizes for the best net and best gros on each course. The visiting ladies taking part in these events, are invited to lunch with the Golf Committee.

Arrangements for swimming, tennis, badminton or golf can be made any other morning, by notifying the Registration Committee at the University Buildings.

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Shopping tours, visits to the Royal Ontario Museum, the I.O.D.E. Preventorium, the Art Gallery, etc., form part of the busy and interesting hours which await our visiting ladies. Professor Currelly of the Royal Ontario Museum and Mr. Greig, Curator of the Art Gallery, will be glad to have visitors to the Convention, either men or women, inspect these buildings at any time during their stay in Toronto, the convention badge entitling all guests to admission.

It is urgently requested that all visitors to the Convention (men and women) register immediately upon their arrival in Toronto, at the Exhibition Hall, University College, University of Toronto. Members of the Ladies' Registration Committee will be present in the Registration Room to distribute convention badges to the wives of all members of the Convention at the time of registration, to give information about the convention programme and make reservations for the dinner. As the tickets for the dinner will be limited to 600, it is very necessary that those desiring to attend this function make their reservations early.

It is desirable that members and their wives indicate to the Registration Committee, as early as possible, the social functions which they will be able to attend,—admission to these functions to be by the Convention Badge.

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Correspondence

London Letter

(*From our Correspondent*)

Acute Rheumatism.—The problems associated with acute rheumatic infections, particularly as they exist in children, continue to attract great attention in this country. Dr. Carey Coombs, of Bristol, has chosen for this year's Chadwick Lectures the subject of rheumatic infection in childhood and the most recent publication of the Child Life Investigation Committee of the Medical Research Council (Special Report No. 114) is concerned with social conditions and acute rheumatism. This report contains material of the highest importance even if the results are largely of a negative character. It is established quite definitely that acute rheumatism is a disease essentially of the hospital class: Dr. G. F. Still states in his introduction that in 700 consecutive private patients he has only seen 5 cases or 0.7 per cent as compared with 13.1 in hospital work. Altogether 721 children attending hospitals in London and Glasgow were examined and their family histories and general environment investigated. For purposes of comparison a similar investigation was made on 200 children attending hospital for diseases other than rheumatism and also with regard to 1,872 children residing in Poor Law Institutions. There was no evidence either of heredity or of any definite predisposing factor associated with any constitutional peculiarity. The evidence with regard to infection is not conclusive in either direction. With regard to social conditions the remarkable fact emerges that if hospital patients are divided up into three classes according to the degree of poverty, the poorest of these, the very poor and destitute group shows a lower incidence of rheumatism than the other two. This fact has been emphasized before, but the present investigation brings it out in a striking fashion. The children in the Poor Law Institutions were remarkably free from rheumatism, only 1 per cent being affected as compared with 3.6 per cent for ordinary elementary school children. This suggests that general environment is the most important factor with regard to rheumatic infection and the report concludes that it is by raising the standard of environment that the frequency of rheumatism in children may be most satisfactorily reduced.

Irradiation on the Growth of Tumours.—With the increasing therapeutic use of x-rays and radium in cases of sarcoma and carcinoma it is of great importance to obtain as much data as possible as to what happens to a malignant tumour when it attempts to grow in an area which has been exposed to radiation. At the Middlesex Hospital, where much of this work is carried out in special research laboratories in connection with a large cancer charity, Professor Russ and his co-workers have recently completed a very ingenious little experiment. They found that if Jensen's Rat Sarcoma be inoculated into young rats and a few days later, with the graft definitely protected by a lead screen, the surrounding area is exposed to radiation from a radium capsule, then the tumour resulting was always smaller than in controls. Such experiments, on more than 100 rats, suggested that irradiation of the skin distinctly hindered the growth of the tumour and this point was tested in a more exacting fashion. A new experiment was carried out in which each rat was covered with lead except for two areas, roughly two sectors of circle arranged like the bulbs of an hour-glass. The rats were then exposed to measured doses of x-rays under an anæsthetic and a few days later a portion of Jensen's Rat Sarcoma was inoculated in the protected area just between the two portions of the "hour-glass." The growth which resulted was very striking in shape for instead of growing more or less uniformly in all directions it seemed to avoid spreading out into the irradiated areas, often assuming a curious shape in consequence. Experiments were devised with the irradiated "hour-glass" arranged at various angles and the results were very constant. The bearing of such observations on the prophylactic irradiation after operations for malignant disease is obviously of great importance.

Nursing Homes.—It is estimated that there are as many as 3,000 convalescent and nursing homes in England and Wales and it is becoming increasingly obvious to the general public that in far too many of the latter there is very little nursing; it is a mockery to call such institutions homes. In fact when a nursing home is bad it is "very, very bad"; and the Nursing Homes Registration Bill, which passed its second reading in Parliament just before Easter, seeks to improve matters. The urge for reform has partly come from the nurses themselves, for it was felt to be a disgrace to the profession that in many institutions up and down the country calling themselves nursing homes, the "nursing" was done by servant girls without a qualified nurse in the place. The regular surgical nursing home appears to be fairly satisfactory, although the middle class patients grumble, and rightly so, at the charges for a bare minimum of comfort. The most serious scandal is the type of home

run for chronic cases among the elderly poor. Such people pay on an average about £1 per week and they are kept under deplorable conditions. The main purpose of the new Bill is to secure registration and the inspection of all nursing homes and to insist that the actual nursing shall be at any rate in charge of a qualified nurse. It has even been suggested that the Act ought to stipulate for a definite proportion of qualified nurses on the staff. Inspection should be carried out by the local medical officer of health assisted by his technical staff, and would be concerned *inter alia* with the suitability of buildings and the sanitary arrangements. There is a certain amount of opposition to inspection and it is suggested that nursing homes owned by medical men should be exempted from registration. However, the Select Committee which has investigated this matter was so impressed with the existing abuses that the Bill is expected to have a smooth passage and nursing homes will therefore be brought into line with maternity homes which were legislated for in the Midwives and Maternity Homes Act last year.

Almoners.—On Maundy Thursday at a service held in Westminster Abbey the lord high almoner, representing the sovereign, distributes silver pennies to the poor, one for each year of the king's life. This custom has descended from the time when religious houses were required to spend at least a tenth part of their income in alms to the poor, and it survives in another direction in the work done by hospital almoners at the present day. In any London hospital when in difficulty with a patient, the out-patient physician or surgeon scribbles a hurried note to the Lady Almoner asking for help and all is well. It says a great deal for the tact and skill of these useful personages that such demands for help never go unheard, and there is a story told of an employer who came to threaten legal proceedings for the treatment given to one of his workmen at a certain big hospital. The distracted casualty officer handed the raging man over to the Almoner's department and he left quietly some half-an-hour later, having given a large cheque for the hospital funds in the meantime! These remarks are prompted by the seventeenth annual report, recently issued, of the Northcote Trust, a fund established at St. Thomas's Hospital for promoting the welfare of past and present patients in various ways. It should be realized that it is not only on the financial side that almoners give such immense help. It is true that the supply of insulin, for example, to poor patients, and during convalescence, arranging for extra nourishment for patients and such like duties are largely a question of "alms", but as the almoner system has developed in recent years it has become a true "social service" department. The patient's home is studied, his environment investigated, his whole social position considered and if necessary adjusted. The almoner acts an intermediary between hospital authorities and the patient, and she is an important part of the voluntary system, preventing the abuse of hospital privileges by the well-to-do ranks of the poor-looking patients, (a very troublesome group) on the one hand and assisting in the carrying out of treatment on the other. Finally the provision of after-care and follow-up services by many almoner's departments is of real value to medical research; in dealing with such diseases as rheumatism, cancer, tuberculosis or with the problems of child-welfare the social investigations by the trained almoner are of utmost importance. The subject is not without its humorous side. The story is told of the man who came to hospital for an abdominal belt and was referred to the Armourer's department!

ALAN MONCRIEFF

London, May, 1927.

Miscellaneous

NERVOUS AFFECTIONS OF THE OESOPHAGUS

In an address delivered under the auspices of the University of London, Dr. A. Brown Kelly of Glasgow took for his subject "Nervous Affections of the Oesophagus." After describing very fully the structure and function of the oesophagus he remarked how little was known—and that mainly of a negative character—about the influence of the symp thetic system on the gullet. He uttered a warning against the passage of bougies blindly before endoscopic examination had been made. In some cases, when spasm had been present for years, malignant disease supervened, and if in such cases a bougie was inserted with the force necessary to overcome the spasm fatal damage might be caused. The patient should be placed under a general anæsthetic, and a thorough examination made. The treatment of this affection consisted in stretching the muscle; the immediate benefit of stretching was that the patient was able comfortably to swallow food which for years he or she had been unable to take. It was important to convince the patient of his new power of deglutition, and he should be required before leaving hospital to eat a variety of foods hitherto impossible. The lecturer

thought that the relation of pharyngo-oesophageal spasm to anæmia would be a fruitful subject for investigation. This association, though recognized by endoscopists, had not been placed on a scientific basis.

Turning next to spasm of the lower end of the thorax, which occupied the main portion of his lecture, Dr. Brown Kelly pointed out that it was in the hiatal region that cardiac spasm was seen. Spasm at the lower end of the oesophagus differed essentially from that at the entrance of the canal owing to dissimilar conditions in the two situations. The muscle, which at the upper end was striated and strong, was at the lower end unstriated and yielding. The upper end was closed except during deglutition, while the lower end expanded and contracted with the movement of the chest. The onset of the disease was insidious and excited little attention, so that the patient, when first seen by the doctor, might have a history of an affection extending back for months or years. His complaint was of occasional difficulty in swallowing and pain in the lower chest. As the symptoms caused only temporary discomfort they might be borne for a long period before advice was sought, but gradually they became more pronounced and the patient became unable to take a meal without obstruction and regurgitation. In the absence of appropriate treatment, death from starvation might terminate one of the periods of enforced fasting. The lecturer exhibited a chart showing in the case of one patient that in the course of four meals in one day he had swallowed 116 oz. of food, of which he had regurgitated 69 oz. and retained only 47.

He next described the method of making the x-ray examination in such cases, and mentioned the interesting investigation by the cinematograph of the part played by the oesophagus during deglutition as revealed by x-rays. The appearance of the dilated oesophagus in cardiospasm was usually fairly uniformly sausage-shaped. Mottling or fuzziness was often seen in the upper part owing to the presence of air, and an irregularity at the deepest part might be due to retained food. Sometimes the oesophagus was spindle-shaped. Dilatation of the oesophagus was met with in other obstructive diseases, but in none did it attain such great dimensions as in cardiospasm. In cancer, cicatricial stricture, and compression stenosis the dilatation was not comparable with that met with in this condition

For endoscopic examination the patient should be placed under a general anæsthetic which permitted a thorough inspection of the oesophagus. In introducing the oesophagoscope rather more resistance was met with than in the normal subject When the oesophagus was entered a large quantity of cloudy fluid rushed along the tube and could be drained off. At the lower end soft masses of food were usually collected. Besides dilatation the oesophagus would be found to have undergone elongation. The average length of the oesophagus from the upper teeth was 40 and 39 cm. in men and women respectively, but in a series of cases of spasm it was found elongated by an average of about 3 cm., without taking into account the fact that the average stature of the group of patients taken was rather below the normal. Heightened reflex activity at the hiatus was looked for in 18 patients with cardiospasm, and found in 17 of them, whereas in patients with affections of the oesophagus other than cardiospasm it was absent in all. This was, therefore, an important sign of cardiospasm. The patient himself could do much to assist in controlling this disturbance, especially by his choice of food, and by the care he exercised in swallowing it. All food must be thoroughly masticated and swallowed with an effort. Several efforts at deglutition might be necessary before it was accomplished, and the presence of a stranger at table, especially if he appeared to the patient to be watching him, might frustrate the act. Similarly, a faulty position of the body might hinder the accomplishment. Some patients felt compelled to eat their meals standing up. Sedatives were not called for in treatment. The passage of bougies assisted deglutition at once, but the improvement as a rule quickly passed off. The surgeon should aim at stretching the cardia to a greater degree than could be attained by the largest bougies, and he gave an illustrated description of an apparatus whereby a rubber pack which could be distended with water was used for this purpose.—*Brit. Med. Jour.* Dec. 11, 1926.

THE DIGESTIBILITY OF FRIED CARBOHYDRATE FOODS

We have frequently heard the opinion expressed that the frying of starchy foods in grease materially interferes with the digestion of the starch. The fat, it is maintained, surrounds the starch cells and thus protects it from the action of the ferment diastase. Miss Donna E. Kerr of the Vancouver General Hospital Laboratories made an attempt to test this out *in vitro*. A quantity of particularly greasy, thin and dry French fried potatoes was obtained and these were cut up into small pieces approximately the size they would be broken up into in mastication Two aliquot portions of the mixture were accurately weighed out and from one the fat was completely removed by ether extraction (Soxhlet extraction.) These two samples were placed in volumetric flasks, made up to volume with a solution of diastase and kept in a water bath at 37° C over night. The solutions were filtered and the filtrate used to determine the amount of reducing sugar produced by the action of diastase. This was done both by Folin's blood sugar method and Benedict's method for sugar in the urine, the results of both methods being almost the same. It was found that the fat-free sample of potato yielded 53.5%

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of reducing substance calculated as glucose, and the fatty sample 51% of reducing substance calculated as glucose. Considering the nature of the specimen, no importance could be attached to this small difference. The emulsification and splitting of the fat which normally occurs in digestion *in vivo*, were naturally absent in the experiment and the efficiency of the diastase might be expected to be less. This experiment would indicate that carbohydrates fried in deep fat are not markedly indigestible.—*Bull. Vancouver Med. Assoc.*, March, 1927.

THE INFLUENCE OF MANURIAL CONDITIONS ON THE VITAMIN CONTENT OF GRAIN

Lieut.-Colonel McCarrison, I.M.S., who is in charge of the Deficiency Diseases Inquiry in South India, has recently published an interesting paper which opens up many new problems regarding the possible causes of vitamin deficiency. He made experiments to determine the relative vitamin content of millet and wheat grown under varying conditions. Three different cultural methods were tested. The grains were grown on plots of ground which had received no manure for many years; in ground treated with chemical manure; and, on plots supplied with cattle manure. The yields of the different plots varied greatly, and the manured plots yielded three or four times as much grain as did the plots without manure. As regards vitamin content, the most striking result obtained was with millet; the grain from the plot which received no manure of any kind appeared to be completely devoid of vitamin B, whilst the content of this vitamin in the grain of the cattle-manure plot was markedly higher than that in the grain from the plot treated with chemical manure. The results of the experiments on wheat were not so clear. Wheat from cattle-manure plots had a distinctly higher vitamin A content than wheat from chemical-manure plots, but although the no-manure plots gave a very poor yield of grain, yet the wheat obtained had as high a content of vitamin A as the cattle-manure wheat. It seems, therefore, that the influence of manure supply on the vitamin production of grain is complex, and that different cereals are affected in different ways. There are many possible reasons for these differences, but it is evident that McCarrison's experiments have opened up large and important problems, and it is to be hoped that this interesting work will be continued. The vast damage that deficiency diseases have in the past produced amongst Eastern races makes it important to learn as much as possible about the conditions governing the vitamin content of the grains that constitute their dietary.—*Brit. M. J.*, Mar. 19, 1927.

THE NATURAL DURATION OF CANCER

A paper on untreated cancer of the breast, by E. M. Daland of Boston, *Surg. Gynæc. and Obst.*, Feb., 1927, provides interesting confirmation from America of the findings published by Major Greenwood, Ministry of Health Reports, 1926, No. 33. Daland deals with 100 and Greenwood with 651 patients. All these cases had, so far as could be ascertained, no treatment of any kind from the commencement of the disease till their death—that is, throughout the entire course of the disease. The duration is measured from the time when the patient first noticed the symptoms of disease—namely, the tumour, till death. Daland finds the mean duration of the disease to be 40.5 months and the median period—i.e., that at which 50 per cent had died—to be thirty months. Greenwood's figures, which are based on three separate series, give a general mean duration of 38.3 months (39.8, 39.57 and 32.78 for the several series), and 27.5 and 24.0 months for the median period. Although the two sets of results are very similar, Daland's data show a somewhat longer duration of life; his series, however, is very much smaller and to that extent less reliable. The same feature is shown in the survivorship tables. Daland finds 40 per cent, 22 per cent, 16 per cent, and 5 per cent alive at the end of 3, 5, 6, and 10 years respectively from the detection of the symptoms; all had died at 13 years. Greenwood's figures are 34 per cent, 16 per cent, and 12 per cent, at the end of 3, 5, and 6 years. In view of the difference in the size of the samples, this is probably as close a correspondence as could be expected, which suggests that the "malignancy" of cancer of the breast is roughly the same in Great Britain and in the East of America. Daland also gives some data of results after radical operation for cancer of the breast. Of 16 cases without glandular involvement, 62.5 per cent were alive at the end of seven years after the detection of the tumour. It is not stated whether any had died of diseases other than cancer, but one had died of operation. These figures are not so favourable as those published last year for the Leeds cases. Out of 39 patients without glandular involvement, 30, or 77 per cent were still alive at the end of ten years after operation, and of the nine deaths six had been due to causes other than cancer. All series of cases are valuable which show the fate of patients at long periods after operation for mammary cancer. So far as they have been published they show how favourable are the results obtained with radical operation at a time when the growth is still confined to the breast.—*The Lancet*, Mar. 5. 1927.

Abstracts from Current Literature

MEDICINE

The Treatment of Encephalitis Lethargica by the Removal of Possible Etiological Factors. Eden, Geoffrey and Yates, A. Lowndes. *Brit. M. J.*, April 16, 1927, p. 714.

While conducting a detailed investigation of the accessory sinuses of the nose in a series of cases of post-encephalitic Parkinson's disease, Yates found that in the normal nose the mucous secretion was carried along in very definite channels by the cilia. He further found that in certain stages of infection the character of the mucus was altered and the movement of the cilia decreased. This change is brought about by long standing infection when the organism is usually that of Friedländer or the pneumococcus, or by a virulent acute attack when the organism is generally the staphlococcus aureus. This latter is associated with an attack of so-called "influenza". In discussing sinus infection Yates considers four stages or types in the alteration of the mucus and cilia. In the first and mildest the mucous secretion is increased and the cilia become more active. In the second, in addition to an increased secretion of mucus, we find serum and leucocytes. In the third stage the mucus becomes altered and irritating, and the cilia in some cases are seen to be abnormally active, but in the majority their activity is greatly lessened. These three first are the milder types and are associated with the local symptoms of rhinitis and laryngitis. In type four the cilia are paralyzed and mucus becomes thin and stagnant and the invading organisms can be obtained in almost pure culture. In twenty-three cases of encephalitis lethargica examined, he found this fourth severe type of change in the mucous membrane about the sphenoidal opening. By injecting indigo-carmine into the sinuses in these cases it was found that the permeability of the membrane is increased to the extent that the dye is recovered from the urine in twenty minutes. In a normal mucous membrane, as well as in the three former stages the dye is not absorbed and cannot be recovered from the urine. Barnes has suggested that this increased permeability of the membrane permits a filter-passing virus to be absorbed. In this way may be explained the possibility of a large number of virus carriers not contracting the disease—they did not have the fourth type of sinus infection with its permeable mucous membrane. Again this type of sinus infection was common, following the influenza epidemic and therefore may explain the occurrence of such a large number of cases of lethargic encephalitis which appeared towards its close. According to Dr. Barnes the path of the infection is probably along the sheaths of the first division of the trigeminal nerve or the branches of the olfactory nerve, and not through the blood stream. He urges that cases of encephalitis which terminate fatally should be carefully examined post mortem, and the first division of the trigeminus and the olfactory bulb and nerve should be sectioned and stained for the virus.

Eden reports cases of encephalitis lethargica ending in Parkinson's disease, in which definite improvement followed washing out of the sinuses, and three acute cases in which the disease seems to have been arrested. The following conclusions are drawn:—

1. It is suggested that the infection in encephalitis lethargica is a symbiotic process; that in the first place the nasal mucous membrane is damaged by some organism of the catarrhal group. Subsequently the virus of encephalitis is inhaled, and passing through the damaged and permeable mucous membrane, enters the tissues, reaching the brain possibly by the perineural lymphatics.

2. In support of this there is a fair amount of evidence that for the transmission of the disease from one individual to another the virus of encephalitis lethargica must fall on mucous membrane previously altered by inflammation where its power of absorbing fluids in contact with it is greatly increased.

3. The initial damage to the nasal mucous membrane is generally remediable by treatment; and when remedied it would appear that the virus of encephalitis is unable to pass into the tissues and patients suffering from Parkinson's disease become more susceptible to the treatment by drugs.

4. Nasal treatment aims not at curing encephalitis but of preventing the entrance of fresh virus into the tissues. Where actual destruction of tissue has occurred in the central nervous system, the most that can be claimed for washing out the sinuses is that further damage is hindered.

5. The Parkinsonian gait and posture is rarely completely removed without the use of remedial exercises.

W. J. McNALLY

Ephedrine—A Clinical Study. Middleton, W. S., and Chen, K. K., *Arch. Int. Med.*, March, 1927.

Ephedrine was first isolated in pure form in 1887 by Nagae. The purpose of the authors' investigation was: (a) to learn the objective and

subjective symptoms after the internal administration of ephedrine; (b) to make an ophthalmological study of the action of ephedrine; and (c) to ascertain the results of the treatment of bronchial asthma with this drug. The form of the drug used was either the sulphate or the hydrochloride.

In a study of 41 patients whose ages varied from ten to 71 years, they found that ephedrine, when given by mouth in varying doses, caused an average rise of systolic blood pressure of 28.5 mm. of mercury. The average duration of this rise was approximately five hours and nine minutes. The diastolic pressure, as a rule, was also elevated. The pulse was sometimes slowed, but more generally it was accelerated following the administration of the drug.

The writers found the most suitable doses for oral administration in adults was 60 to 90 mgs. or from one to one and a half grains. They noted that the most common symptoms from over-dosage were, diaphoresis, tremor, extra systoles, tonal arrhythmia, palpitation, weakness, a feeling of warmth, chilly sensations, nausea, vomiting and dizziness. Those of less frequency are tachycardia, restlessness, mydriasis, nervousness, headache, insomnia, tired feeling and drowsiness. It is the authors' feeling that the drug should be used with caution in case of cardiovascular disease.

In regard to the action of ephedrine on the pupil, it was found that a 10 per cent solution of the sulphate, or the same concentration, with the addition of 0.1 per cent homatropine could be used locally as a mydriatic for routine ophthalmoscopic examinations. The former seemed more adaptable for elderly people, while the latter was suitable for adults and children. These solutions produced rapid mydriasis, without any undesirable effects or cycloplegia.

Ephedrine was also employed for the relief of bronchial asthma in 25 cases. The group was an unselected one, and the duration of the condition varied from weeks to almost 50 years. The frequency of attacks varied from once a year to a constant condition, and the duration of attacks from a number of hours to years. The dose employed was from 50 to 100 mgs. and it was never given more frequently than every two hours. The results of this administration were that the attacks were controlled in nine cases and caused improvement in eight other cases. The remainder showed negative or inconclusive results. L. C. MONTGOMERY

The Accidental Heart Murmurs. Martini, P., *Klin. Wochnschr.*, 1926, v, 62.

In this paper the discussion of so-called accidental or functional heart murmurs is introduced by an analysis of the four chief factors, which enter into the production of a heart murmur. These are: (1) the presence of a constriction through which the blood is forced; (2) the properties of the containing heart or vessel wall and of the chest wall as to their ability to transmit vibration waves; (3) the speed of the blood stream which determines the frequency of the vibrations and therefore the pitch of the murmur; (4) the viscosity of the blood; the lower the viscosity, the more easily is a murmur produced. An accidental murmur is defined as one which is not associated with organic disease of one or other of the cardiac valves. The murmurs that are present when, with dilatation of a valve ring the valve becomes insufficient, also fall into the class of accidental murmurs; the mechanism of production as well as the sounds characteristic of these murmurs closely simulate those of organic valvular disease with insufficiency and the differential diagnosis must depend largely upon other clinical data. The systolic murmurs so often heard between the apex and base in apparently normal healthy persons are difficult to explain in the light of present knowledge. Closer study of these individuals frequently reveals nervous symptoms and impairment in physical strength. The author suggests that in these cases the papillary muscles do not function normally, perhaps due to nervous influences, and that in this way failure of complete valve closure results. As for the systolic murmur heard over the pulmonic area, in the absence of any evidence of organic heart disease, he attributes these largely to impingement of the thin-walled pulmonary artery on the sternum with consequent local compression of the artery. An aortic systolic murmur occurs in the presence of a normal aortic valve when the ascending arch of the aorta is dilated; these conditions are analagous to those of a narrowed aortic orifice with a normal-sized aorta.

There exist also three types of murmurs which are independent of faulty valve closure. The first of these occurs in patients with chlorosis, severe anæmia, and in toxic goitre (without cardiac enlargement). In such cases the diminished viscosity of the blood or the increased rate of flow of the blood stream, or both these factors, bring about the murmur. In young people with chlorosis the thin-walled pulmonary artery lends itself very well to the transmission of vibrations, and this helps in producing the murmur. The second type is characterized by a high-pitched musical quality of the murmur, due to the vibration of an aberrant chorda tendina. The third group originate not within the heart but outside it. To this class belong the so-called cardio-pulmonary (cardio-respiratory, pleuro-pericardial) murmurs. Some of these have as an anatomical basis the friction between pleura and pericardium, others may be explained by the theory

advanced by Wintrich, Gerhardt, Potain and others, namely that with systole of the ventricles, negative pressure suddenly exerted on the surrounding lung could cause a movement of air in the alveoli which would give rise to the murmur. H. N. SEGALL

Renal Glycosuria and Pentosuria. Jones, W. H., and Sussman, W., *Am. J. M. Sc.*, April, 1927.

Renal glycosuria is characterized by dextrose in the urine, a normal blood sugar content, the absence of the usual symptoms of diabetes, the fact that the condition does not become true diabetes, that it sometimes occurs in more than one member of the family, that the usual tests for renal function yield normal results, that the urine does not indicate the presence of nephritis and that the pancreatic function is not disturbed.

Essential pentosuria is a condition occurring most commonly in the Jewish race often present in several members of the same family. It is characterized by the presence of a pentose in the urine more or less continuously, by the presence of a normal blood sugar, by the absence of signs of nephritis, by the absence of symptoms of diabetes, by the fact that a high carbohydrate intake does not increase the pentose, and that the pancreatic function is normal.

There are less than 100 cases in the literature, probably it is often unrecognized.

The urinary reducing substance reacts with Fehling's, Nylander's and Benedict's tests in such a manner that it is impossible to differentiate the condition by this means.

Details of the tests to differentiate dextrose from pentose are given. LILLIAN A. CHASE

SURGERY

Fat Necrosis of the Breast. Gottesman, J. and Zemansky, A. Philiph, Jr., *Ann. Surg.*, March, 1927.

The recognition of fat necrosis of the breast is important because of its similarity to carcinoma both clinically and pathologically. It was first studied by Lee and Adair in 1920, and in 1924 these authors reviewed 20 reported cases.

The cases occur in obese women and follow direct trauma. A mass develops in the breast or subcutaneous tissue and is usually painless. It is freely movable but later becomes fixed to the surrounding tissues. There is seldom nipple retraction, a fact which assists in diagnosis, and the axillary and supraclavicular lymph glands are seldom palpable.

Ewing gives the following pathological differentiation: "In traumatized fat the nodules are irregularly distributed throughout the breast and fade into the surrounding breast tissue, while carcinomatous nodules occur singly and are sharper in outline. The newly formed connective tissue of fat necrosis is red, due to the formation of fine capillaries which are absent in carcinoma. Later, cicatrization obliterates these capillaries and the connective tissue of fat necrosis becomes as dense and opaque as in carcinoma. On section, the fat cells lying in cicatricial connective tissue resemble the small alveoli of carcinoma. The presence, however, of fibroblasts, mingled with lymphocytes, empty fat spaces, phagocytic giant cells and wide areas of proliferating fat cells, helps to differentiate this condition from cancer."

In the series reported, the most characteristic findings were disorganized fat cells, invaded by new connective tissue, with deposits of fatty acid crystals in rosette form. Large and small foreign body giant cells surrounded the fat crystals and, at the periphery of the lesion, pigmented cells were often found.

The authors made a study of 78 cases of non-malignant breasts removed at the Mount Sinai Hospital, New York, and, in 14 of them, fat necrosis was found. In these cases a history of trauma could not be elicited. In considering the age, the presence of obesity and pain, there was nothing typical from a diagnostic standpoint. The tumour in 12 cases was stony hard and in one case it fluctuated. In only one case out of the 14 was there history of trauma. In two others the lesion followed a surgical procedure.

The authors divided the cases into 4 groups: (1) fat necrosis in the subcutaneous tissue overlying the breast; (2) fat necrosis occurring in a single tumour mass; (3) fat necrosis occurring in multiple punctate areas in a breast the seat of some other pathological process; (4) fat necrosis occurring in a lipoma of the breast.

The authors conclude that fat necrosis is a response of fatty tissue to an irritant, with factors other than trauma existing, and that fat necrosis frequently occurs in diffuse inflammatory or cystic disease of the breast and that the escape of fatty material from a dilated duct and its subsequent decomposition plays a rôle in the causation of this process.

R. V. B. SHIER

Benign Tumours of the Stomach. Balfour, Donald C., and Henderson, Earl F., *Ann. Surg.*, March, 1927.

Benign tumours of the stomach are of unusual interest since they may cause serious complications, are easily overlooked in examination and can be dealt with only surgically. While less than half of 1 per cent of gastric neoplasms are benign, they occur sufficiently

often to make it imperative to exclude them in unexplained indigestion and chronic anæmia.

The present study is based on 58 cases which have come to operation at the Mayo Clinic. The tumours vary in size from 5 mm. to one weighing 1,000 grm., the latter being a dermoid cyst filling the peritoneal cavity. In 45 cases the tumours were single and in 13 multiple. In 22 cases the tumour was associated with other lesions.

Benign tumours are symptomless unless complicated by bleeding, ulceration, pyloric obstruction, or interference with gastric motility and secretion. The most frequent and important sign is anæmia of the secondary type and the anæmia may be so severe as to suggest pernicious. The hæmorrhage may be so severe as to give an acute secondary anæmia. Pyloric obstruction is usually intermittent and occurred in 10 per cent of the cases. Differential diagnosis is dependent almost entirely on fluoroscopic examination. In 92.6 per cent of the cases examined radiographically the lesion was revealed; and in 48 per cent the lesion was reported as benign.

There are various types of tumour which cannot be distinguished by the symptoms. They are as follows: (1) fibro-adenomatous polyps; (2) adenomas; (3) fibromas, myomas, and similar tumours; (4) hæmangiomas; (5) polyposis; (6) hypertrophied mucosa; (7) papilloma; (8) dermoid cysts.

In the 58 cases the tumour was removed in 57, the other being a case of polyposis involving the whole stomach. Patients with marked anæmia were transfused freely and, when necessary, the operation was performed under local anæsthesia. In 36 cases where the tumour was the only lesion, it was removed by excision alone in 17 and in the remainder by a resection of a segment of the stomach. In larger tumours the possibility of malignant degeneration makes partial gastrectomy advisable, for in one case carcinoma developed at the site of the pedicle attachment.

R. V. B. SHIER

Ureteral Stricture. Hunner, *Am. J. M. Sc.*, February, 1927.

Dr. Hunner refers to the time when appendicitis led to so many tragedies because undiagnosed, and feels that ureteral stricture is in somewhat the same position now as far as diagnosis is concerned. He mentions two types: (1) congenital; which are either anomalies of development or the result of inflammation caused by placental circulation; (2) acquired; due to injury, syphilis, pressure from tumours, spread of inflammatory processes in neighbouring tissues, and last and most important of all, focal infection, in some other part of the body. Carbuncle, gall bladder, appendix, bone inflammations, an acute infectious disease of childhood may all leave inflammatory areas in the ureter which may produce stricture later in life. Infections in the region of the head play a large part: tonsillitis, sinusitis, and dental abscesses.

Naturally local treatment of the stricture is unavailing if the focus remains. Symptoms related to the ureter are often prominent after tonsillectomy or after attacks of grippe and similar infections. The bilateral situation of the stricture is very suggestive of a "distant" focus. The author thinks the infection attacks the neighbouring lymphatic glands and then invades the ureteral wall. Symptoms are vague and numerous but there is often some bladder trouble. There is usually tenderness over the ureter where it crosses the pelvic brim. The pain may be referred to any part of the abdomen, the urine may show much or little. The author refers to the many grades of damage to the kidney possible, if this condition escapes notice, and urges the general practitioner to be alive to its prevalence. The treatment is establishment of good kidney drainage by dilatation and other means.

P. M. MACDONNELL

PÆDIATRICS

Classification of Pulmonary Tuberculosis in Children. Reisman, H. A., *Arch. Pæd.*, March, 1927.

The author presents a clinical classification dependent on the tripod essential to the diagnosis of pulmonary tuberculosis in childhood: (1) a definite history of contact; (2) a positive tuberculin test; (3) the presence of enlarged tracheo-bronchial glands. The importance of history of contact infection is stressed by the author. Different authorities have been quoted to show that 64 to 81 per cent of all children giving a definite history of exposure become infected. On the contrary, only 5 per cent of children give positive tuberculin tests who do not give a history of exposure. Schram, from a study of the tuberculin tests in children living in homes where active tuberculosis is present, concludes that it is impossible to protect a child in such a home.

The tuberculin test is of great value and the author recommends the intradermal method. He classifies the patients with a positive tuberculin test under the following headings: (1) those who give a positive tuberculin test with no other evidence of the disease; (2) those who give a positive tuberculin test with slight enlargement of the tracheo-bronchial glands; (3) those who give a positive tuberculin test with massive enlargement of the tracheo-bronchial glands.

In 95 per cent of the children who have a tuberculous lesion, the primary focus is in the

lung and the secondary infection in the tracheo-bronchial glands. In the other 5 per cent, the primary lesion is in the alimentary tract, skin or genitals. It is of great importance to appreciate that, at least in the early tuberculosis of childhood, the hilus glands are the only apparent seat of infection. The physical signs of enlarged glands are usually unreliable, and therefore patients with a history of contact, a positive tuberculin reaction and enlarged tracheo-bronchial glands as ascertained by x-ray, should be diagnosed incipient tuberculosis. Even when the hilus glands show great enlargement, the physical signs may be absent, although at times d'Espine's sign may be present and a few fine crepitant râles may be heard. Apical lesions of the adult type seldom occur before the age of ten years.

He sums up his clinical classification as follows:

Group 1.—Children who give a definite history of contact but with a negative tuberculin test.

Group 2.—Children with a definite history of contact, a positive tuberculin test, but with no definite evidence of disease nor any appreciable enlargement of the tracheo-bronchial glands.

Group 3.—Incipient tuberculosis in children; those giving a definite history of contact, a positive tuberculin test and slight enlargement of the tracheo-bronchial glands as ascertained by x-ray.

Group 4.—Massive enlargement of the tracheo-bronchial glands extending above the root branches, encroaching upon the central lung field and pushing toward the interlobar septum with nodulation, fibrosis, and calcification, with a positive tuberculin test.

Group 5.—Adult type. Parenchymal infiltration and breaking down of the lung tissue with tendency to cavity formation and with definite physical signs, superimposed upon the juvenile type. S. G. Ross

Flatfoot in Children. Brahdy, Bernard, *Arch. Pæd.*, Feb., 1927.

This author found 19 per cent of children of the pre-school age in his clinic suffering from flat foot. As this was in a clinic for healthy children, he thinks this high percentage makes this condition one of great importance. The etiology includes such factors as muscle weakness, improper footwear, excessive weight, systemic disease, trauma, developmental defects, and congenital anomalies (rare).

Commenting on these it is pointed out that Morton has shown that the muscles are not weight supporting, but serve chiefly to balance the body weight upon the foot. Any muscle weakness, however, such as occurs in rapidly growing children, will tend to cause flatfoot. Tight stockings, as well as badly fitting shoes, will do harm to pliable feet. Any sudden increase in weight may also put a strain on the foot ligaments, which in turn may result in falling of the bony arches. Systemic disease such as rickets and arthritis, may affect the joints directly. Different muscle palsies and prolonged illnesses, bringing about atrophy of muscles from disuse, may also bring about this condition. Trauma may be either direct or indirect, and produce its effects through immobilization of the limb.

The condition is essentially one of a pronated and everted foot. Certain muscles and their tendons are thereby stretched, *e.g.*, tibialis anticus. Separation of the mesial bones of the foot is a result and the arches fall. As a result of the condition of flatfoot the patient complains of being easily tired on running, the foot is usually pronated and everted, and the internal malleolus is prominent. Imprints of the patient's feet on paper may serve for diagnosis and later on for evaluating the results of treatment.

Morton divides flatfoot disorders into two stages, the first of functional deformity and the second of structural deformity with bone distortion. The first stage is the predominant type in children.

The essential points in treatment are:—

1. Correction of pronation and eversion with maintenance of the correction by teaching the child proper walking exercises. Corrective exercises should be demonstrated on the child in the presence of the mother, who is told to insist on the child doing them for five or ten minutes daily.

2. The strengthening of weakened muscles and ligaments is to be aimed at. Well fitting stockings are essential. Shoes should be full laced, have low heels, and a broad sole, connected by a narrow shank. The inner side of the sole should be practically a straight line. The inner side of the heel should be elevated one-eighth to one-quarter of an inch. The Thomas heel which lengthens and raises the inner side of the heel is useful.

3. Any associated pathological condition demands treatment. Massage of the muscle is useful if these should become atrophied, as may occur after a long illness. The majority of cases should show improvement in six months, and all within a year. S. Graham Ross

ANÆSTHESIA

On the Ignition-Points of Gases in Nitrous Oxide. Dixon, H. B., *Lancet*, 1927, ii, 247.

Joseph Priestly, when he discovered nitrous oxide, or as he called it "dephlogisticated nitrous air", in 1776, observed that a candle burnt in the gas with a flame "sometimes twice

as large as it is naturally, and sometimes not less than five or six times larger".

Both ethylene and propylene form with nitrous oxide highly explosive mixtures. They both burn in this gas with an enlarged flame having an intensely luminous zone. Ethylene ignites at a lower temperature in nitrous oxide than in oxygen. Propylene ignites at a lower temperature both in oxygen and nitrous oxide than does ethylene. W. B. HOWELL

Anesthésie Rachiadienne Limitéé a la Region Périnéale par l'Emploi d'une Solution Concentrée de Novocaine. (Technique de Ravaut Appliquée a l'Obstetrique). Risacher, S. E., et Waitz, L., *La Presse Medicale,* March 2, 1927, p. 277.

A strongly hypertonic solution of novocaine is used. It is made by dissolving 50 grammes of novocaine in 50 c.c. of distilled water. The amount injected is only a drop and a half. This sinks at once to the lowest part of the subarachnoid space, without affecting the roots of the cauda equina. The anæsthesia is limited to the vagina, vulva, perineum and anus.

The patient remains in the sitting position for about two minutes after the injection. The head and shoulders are kept elevated after the patient is put in the recumbent position. Anæsthesia lasts from an hour and a half to two hours. Muscular relaxation of the vagina and perineum is complete but uterine contractions are unaffected. This form of anæsthesia is specially useful for the application of forceps, internal version, breech delivery, perineorrhaphy, and the repair of tears.

This method of obtaining anæsthesia is often useful in such operations as removal of Bartholinian glands, hæmorrhoids, etc. The writers have not observed any unpleasant after effects, except slight headaches in three patients. Its use for operations during pregnancy never led to premature delivery. W. B. HOWELL

Spinal Anæsthesia; a study of its use in 536 Cases. Campbell, Meredith F., *Brit. J. Anæsth.,* 1927, iv, 162.

In the urological service at the Bellevue Hospital, New York, spinal and local anæsthesia are used extensively, and general anæsthesia, comparatively seldom.

A method called "double" or "split" spinal is used in suprapubic prostatectomy. This consists in injecting novocaine in the twelfth dorsal space and in the third lumbar. The effect of the lower injection is to anæsthetize the nerves in the cauda equina which are centrally located in the cord at the site of the upper injection.

Spinal anæsthesia is specially indicated where there is high blood pressure. Low blood pressure (100 mm. or lower) is a contraindication, as are marked embarrassment of the cardiac or respiratory systems, and serious toxæmia.

Of 536 cases of spinal anæsthesia, two died from shock, after operation, both being extremely toxic at the time. W. B. HOWELL

Shock and Collapse.—In his Hunterian Lecture to the Royal College of Surgeons of England on February 28th Mr. Zachary Cope performed a salutary task in drawing attention to the vague state of the common understanding of the terms "shock" and "collapse." He attempted a more precise definition of the terms, and at the same time justly emphasized the variability of the clinical manifestations of these states. In particular he drew attention to the importance of the slow pulse-rate which sometimes accompanies shock and has often misled observers into a sense of false security. A slow pulse-rate is a grave sign if associated with a low blood pressure, estimation of which is easily made but often neglected. Mr. Cope showed, however, that even lowering of the blood pressure is not a constant sign. The late war afforded all too many opportunities for observing shock, and the stimulus of war needs provided most of the scientific evidence on which our knowledge of shock is based. Mr. Cope now seeks to apply the principles thus learnt to the fuller understanding of the surgical emergencies of civil life, especially perforations of a gastric or duodenal ulcer. He gave point to his remarks by quoting the case of a patient who was operated upon so quickly after the perforation of a duodenal ulcer that the combined shocks of perforation and of operation caused his death. The mysteries of "latent shock" and "delayed shock" were intensely investigated during the war, notably by Dale, Bayliss, and Cannon, but the theories then formulated have not provided a final solution. Mr.Cope's plea for recognition of the importance of the clinical observation of surgical emergencies gained much force from the actual cases which he described. He did not, for the present, enter upon discussion of the principles to be observed in treating the condition of shock, but this can only follow on further elucidation of the factors that are at work in its production.—*The Lancet,* March 12, 1927.

Obituaries

Dr. Henry W. Baldwin, one of Edmonton's oldest physicians died suddenly on March 28th, while attending a patient in his office. He had been a sufferer from angina pectoris, and he himself anticipated the manner of his passing. He may be said to have died in harness.

The late Dr. Baldwin was 77 years of age and had had an eventful career. He served in his early years in the North West Mounted Police, later going to the United States where he was attached to the Army Medical Service for some years. Shortly before the Boer War he returned to Canada, and went to South Africa enlisting as a private. When discovered to be a medical man he was transferred to the medical corps. Returning to Edmonton after the Boer War he soon went north to Fort Vermilion, in the Peace River Country, where he gave his services to the Indian Reservations and to the scattered population over the largest area in Canada dependent on the service of a single physician. Here he did very creditable work for many years, making a special study of Indian remedies for cancer and tuberculosis, and on his return to Edmonton eight years ago, he used the knowledge acquired in the treatment of these diseases, apparently with benefit in some cases.

Debonair, gentlemanly, kind-hearted and self sacrificing for the benefit of humanity, he lived a life which gained for him the respect and esteem of all the members of the medical profession who had the good fortune to know him, and the eternal love and gratitude of his patients.

The funeral service was held on April 4th from All Saints Church conducted by the Rev. Pierce-Goulding and the pall-bearers were Superintendent Ritchie and Inspector Montizambert of the Royal Canadian Mounted Police and Dr. Braithwaite, Dr. Harrison, Dr. Dunn and Dr. Whitelaw representing the physicians of Edmonton.

Dr. John Brownlee. We regret to notice that Dr. John Brownlee, statistician to the Medical Research Council, died recently after a very short illness in his sixtieth year. Educated at the University of Glasgow, he graduated with first class honours in Mathematics and Natural Philosophy. As physician-superintendent of the City of Glasgow Fever Hospital he acquired a reputation on all matters in connection with infectious disease. He made important contributions to the statistical study of disease. His ability to apply mathematics to biological problems led to his appointment as first director of the Department of Statistics of the Medical Research Council.

Dr. Richard R. Hopkins died suddenly in Toronto on Thursday, May 5th. Coming to Canada in 1876, he taught in the Ontario schools of Fordwich and Harriston for some years, entering later Trinity University Medical School and graduating in medicine in 1887. After practising some years at Grand Valley, Dr. Hopkins moved to West Toronto and then to Toronto Junction. For many years Dr. Hopkins had been M.O.H. for West Toronto and had been chairman of the Public Library Board; he was on the associate staff of Grace Hospital and was also coroner for York County. Well known in his medical work, Dr. Hopkins was also active in religious, political and masonic circles for many years. He is survived by two sons, one of whom, A. G. Hopkins is a well-known practitioner in Toronto.

Dr. Robert Kaines, one of the best known general practitioners in St. Thomas, died there on May 3rd, in his 79th year. Born in Grenville, Quebec in 1849, he came to St. Thomas with his parents 10 years later, was educated in the town schools and was later an apprentice in the pharmacy of the late Dr. Gustin. Entering the Toronto Medical School, he graduated as M.D., in 1879 and was appointed as the first house surgeon at Victoria Hospital in London. Leaving London, Dr. Kaines practised in Aylmer, then went abroad to take post-graduate work in St. Thomas Hospital, returning with the degree of M.R.C.S. Settling in St. Thomas, Dr. Kaines began his long career as a family practitioner and became one of the most successful surgeons in the district. Extensive as were his professional duties, he yet took keen interest in other matters and for many years he was surgeon-major in the old 25th Elgin Battalion. He was as well a director of the South Western Savings and Loan Company, and vice-president of the Southern Loan and Savings Company, for some years. The doctor had retired from active practice in 1918 and for the last 10 years had contented himself with the medical work at the county jail, of which he was surgeon.

Dr. Campbell Myers, well known in neurologic and psychiatric circles, died in Toronto on April 20th. A keen student of his subjects, Dr. Myers had contributed much to the literature on mental disorders and was for many years in charge of the large sanitarium in the north of the city, a sanitarium of exceptional repute and one made use of by many physicians of the province.

Dr. Horace Rindress, of North Sydney, Nova Scotia, died very suddenly on April 13th. After a busy day at hospital and other professional duties, he was stricken while at supper and passed away almost immediately. Dr. Rindress was a very popular physician—genial, kindly and sympathetic, and had a large practice. He was a graduate of the University of New York. Honorable George H. Murray, former Premier of Nova Scotia, and Dr. Robert L. Murray, of Dartmouth, are half-brothers.

News Items

GREAT BRITAIN

A gift of £74,000 to Edinburgh University has been made by the International Education Board. This gift will be applied as a contribution to the cost of a new department of zoology, which is to be created at the King's buildings of the university, in the Craigsmillar district of the city. Of the total sum £30,000 is for the buildings, £10,000 for the equipment and £26,000 for endowment.

A donor who desires to remain anonymous has

offered the University of London the sum of £10,000 towards the establishment of a chair of dietetics.

Five addresses, spread over the period February-June, have been arranged as part of the centenary celebrations of University College, London. The speakers include Professor E. H. Starling, on "A Century of Physiology" on February 28, and Sir Oliver Lodge, on March 14, on "A Century's Progress in Physics."

Dr. C. Gordon Douglas, of Oxford University, will give the Oliver-Sharpey lectures, on the co-operation of the respiration and circulation with variations in bodily activity, on May 3rd and 5th.

The University of Leeds has accepted an offer by Dr. L. R. Braithwaite, surgeon to the Leeds Infirmary, to present to the Medical School a bronze bust of Sir Berkeley Moynihan.

According to the *Journal of the American Medical Association*, Guy's Hospital, London, will celebrate the centenary of the publication of Bright's Reports of Medical Cases in July. Richard Bright settled in London in 1820 and was associated with Guy's Hospital from that year until 1843 when, resigning, he was made consulting physician. Invitations to be present at the celebration have been accepted by distinguished persons from all parts of the world, and the Royal College of Physicians of London will give a conversazione.

A Lister memorial volume has been prepared, and with the consent of the council of the British Medical Association it will constitute the book of the meeting in so far as a copy will be presented to each member of the association who registers. The volume, edited by Dr. Logan Turner, contains a variety of contributions; a sketch of Lord Lister's life is given by his former house-surgeon, Sir George Beatson, of Glasgow. A series of short personal reminiscences has been written by Sir William Watson Cheyne, Dr. Rutherford Morison, Dr. Grasett, Dr. Baldwin, Dr. T. R. Ronaldson, the late Professor Francis Caird, Dr. Stewart (Halifax), Dr. Douglas (Cupar) and Mr. Hamilton Russell, of Melbourne. Two of Lister's scientific addresses and a series of letters of general interest are incorporated in the book.

According to the *Journal of the American Medical Association*, the section on surgery of the Royal Society of Medicine of England is arranging a post-graduate tour of the United States and Canada starting on July 23rd, and including Boston, New Haven, New York, Philadelphia, Baltimore, Washington, Cleveland, Detroit, Ann Arbor, Grand Rapids, Chicago, Rochester, Minn., the Great Lakes, Niagara, Toronto, Ottawa and Montreal. The facilities of the tour on the same terms will be offered to physicians not fellows of the society, if nominated by two members of the section and approved by the tour committee.

A memorial tablet to the late Sir Patrick Manson was unveiled by the British Minister of Health, on March 15th, at the Royal Albert Dock Hospital. The tablet was erected by the Seaman's Hospital Society to commemorate the great services of Sir Patrick Manson to that society as well as to the cause of science. Sir Patrick was elected physician to the society in 1892, and laboured almost continuously in its service for twenty years until he retired in 1912.

The History of Science Society, in collaboration with committees from The American Mathematical Society, Mathematical Association of America, American Astronomical Society and the American Physical Society, proposes to commemorate the 200th anniversary of the death of Sir Isaac Newton by an appropriate programme at Columbia University, New York, November 25 and 26, 1927.

AUSTRALIA AND NEW ZEALAND

The *Medical Journal of Australia*, March 19, 1927, contains an editorial warning to the Australian medical profession regarding the employment of unregistered nurses. After pointing out that the General Medical Council forbids professional dealing with unregistered or irregular practitioners, it shows that the organizations representative of the nursing profession (in Australia) will not countenance any collaboration with untrained women, either in the field of general or obstetric nursing. In this matter the Australasian Trained Nurses Association and the Royal Victorian Trained Nurses Association have some cause for complaint against the medical profession, since it is alleged that many medical men who would not think of professional recognition in the case of unregistered, amateur doctors, work with women who are neither trained nurses nor are registered under an act in virtue of having acted as nurse or midwife for years before the measure became law.

It is urged that the medical profession should refuse to accept any responsibility for the welfare of patients unless the nurses in attendance are trained and registered either by law or by the representative nursing organization.

The correspondent of the *British Medical Journal* writes that the troubles met with in the old country in regard to irregular practice have taken root here also. The newly formed Association of Botanic Medical and Naturopathic Practitioners, bases its claim for recognition upon a still unrepealed Act of Henry VIII. A deputation waited upon the Chief Secretary, asking for legislation to enable them to be registered as a body entitled to practise their peculiar arts, to give certificates of health, and, what is still more necessary, certificates of the cause of death. Fortunately the matter was referred to the Medical Board for its opinion, and its report apparently satisfied the Labour Government that it would not be wise to obey the deputation's behest. The Crown law officers too have received instructions to enforce the provisions of the Medical Act as regards unqualified persons assuming the title of doctor. Curious divergence of opinion as to the reading of the Act has been evinced by the judges of first instance before whom the offenders have been brought, but doubts have been speedily cleared up on the Crown appealing to the Supreme Court.

Physique of School Children

A physical survey of 20,000 New Zealand school children has been completed, and compares favourably with a similar survey undertaken in 1913. The conclusions may be summarized thus: (1) New Zealand school children show superiority in height and weight

when compared with the available statistics relating to those of Australia, Great Britain, America, and Toronto. (2) New Zealand town school children have definitely improved in height and in weight during the years 1913-25. (3) Sitting height relatively to standing height is less in New Zealand children than in Glasgow children. (4) There is no noteworthy difference to be found in height and in weight of New Zealand children grouped according to birthplace of parents. (5) Children of farmers are tallest and heaviest, and children of professional men are almost as tall as children of farmers, but show no excess in weight over the average. (6) The height and weight of children in rural schools are greater than in city schools, and the average physical development of children with good mental attainment is greater than of those with inferior ability.

GENERAL

The laboratories of the Banting and Best Chair of Medical Research at the University of Toronto have been moved from the medical building to the pathological department.

Dr. Alphonse R. Dochez, professor of medicine in the Columbia University College of Physicians and Surgeons, gave a De Lamar lecture at the Johns Hopkins University School of Hygiene and Public Health on February 21 on "Preparation and Use of Scarlatinal Streptococcus Antitoxin."

Professor A. V. Hill, Foulerton professor of physiology at University College, London, addressed the scientific staff of the Rockefeller Institute for Medical Research, New York, on March 25 on "The Viscous-elastic Properties of Muscles and their Molecular Basis."

Dr. Chevalier Jackson, professor of bronchoscopy and œsophagoscopy at the Jefferson Medical College, has been presented with the $10,000 Philadelphia award, given annually by Edward W. Bok to the person who has done the most to advance the city's interest during the year. Dr. Jackson was given the award for his invention and use of the bronchoscope.

The *Canada Lancet and Practitioner* for May in its comment on the celebration of the Lister Centenary, mentions the fact that Lord Lister visited Toronto in 1896, when the British Association met there. It also calls attention to the fact that there are two old house surgeons of Lord Lister in Toronto, Dr. F. LeM. Grasett and Dr. E. St. G. Baldwin.

The number also contains a note on the life of St. Francis of Assisi. Amongst the many inspirations deriving from the saintly life of St. Francis few have taken a more beautiful form than Rostand's "Bird's Prayer" beginning,

"O God of Little Birds,
Who made our bodies light as spoken words;
Who painted Thy blue sky upon our wings."

which has been printed in full.

NOVA SCOTIA

There is in the *Nova Scotia Medical Bulletin* for April a strong editorial appeal for consideration of the problems concerning the treatment of mental disease in the province, founded on a paper in the same issue by Dr. F. E. Lawlor, Superintendent of the Nova Scotia Hospital. The doctor draws a picture which is little short of pathetic, of the antiquated condition of the care of the insane in Nova Scotia and states that there are certain institutions in the province which have not such a thing as a bathtub and some which even lack toilet facilities. His main appeal, however, was for better and more equipment for the Nova Scotia Hospital itself, such as an x-ray apparatus, a laboratory, a modern hydrotherapeutic plant, a vocational department and the services of a dentist. All these things a hospital of that type must have if it is to continue to do really effective work, or to show any evidence of development.

Local examinations for the certificates of the Medical Council of Canada are to be held at Halifax, beginning June 6th.

At the graduating exercises of the Sydney City Hospital, held late in April, six young ladies were awarded the diploma of the training school.

His many Halifax friends regret exceedingly that Dr. N. B. Dreyer, Assistant Professor of Physiology at Dalhousie, is to leave Halifax at the end of the present session to accept an appointment to the Department of Pharmacology at McGill.

Word has been received at Halifax that Dr. H. G. Grant, a graduate of Dalhousie who practised for some time at Halifax, has been offered the Deanship and the Professorship of Preventive Medicine of the Medical School of the University of Virginia. Dr. Grant is at present the epidemiologist of the Virginia State Board of Health.

The provincial government has decided upon the appointment of a business manager at the Nova Scotia Hospital, and hereafter Dr. Lawlor is to be relieved of the business administration and will devote himself to medical and allied duties. The medical staff is to be reduced by the retirement, at the end of May, of Dr. R. L. Murray, who has been assistant medical superintendent for more than 13 years.

The Halifax Branch of the Medical Society of Nova Scotia terminated the session of 1926-27 on April 28th by a dinner meeting held at the Ashburn Golf and Country Club. The reports on the activities of the session were all very favourable. New officers were elected as follows: President, Dr. George H. Murphy; Vice-Presidents, Drs. S. R. Johnston, A. E. Doull and H. A. Payzant; Secretary, Dr. Clement

XUM

MacLeod. The Executive consists of these officers together with Drs. J. N. Lyons and T. M. Sieniewicz.

Dr. Clarence F. Moriarty recently spent a few days at his old home in Halifax, before taking his departure for the Philippine Islands. Dr. Moriarty, who is a graduate of Dalhousie, has been appointed to the staff of the International Health Board, Rockefeller Foundation, and goes to the Philippines to direct the work being done there by the Board and particularly to engage in the study of malaria. Mrs. Moriarty, who is a graduate in dentistry of Dalhousie, and who has been associated with her husband in former studies of malaria, accompanies him to his new field of labour.

Old friends and students of Dr. D. Fraser-Harris, formerly Professor of Physiology at Dalhousie University, are much interested in his latest book which has just been published. *Nerves—Master-system of the Body* is one of a series of modern health books published by Faber Gwyer and edited by Dr. Fraser-Harris. These books are attractively written and printed and offered at an unusually low price. The number of the series which is written by Dr. Fraser-Harris himself is not to be confused with another book by him which is also entitled "Nerves". It loses nothing by comparison with the other books of the series, each the work of a well-known specialist, and is characterized by the clearness and charm of expression for which the author is noted.

Several months ago reference was made in this column to an action for damages brought against Dr. C. D. Desbrisay, a Halifax dentist, by the parents of a girl who had died suddenly in the dentist's chair while under an anæsthetic administered by a physician who has since died. The claim was for damages to the amount of $5,000.00. The action resulted in favour of the defendant and an application for a new trial was dismissed with costs. Recently, however, a motion for appeal to the Privy Council was made before the full court, under the rule that leave to appeal from any final judgment of the Court may be granted in a matter in which a sum not less than $500 is in dispute. The Court decided that this case came within the rule and granted leave to appeal, the applicants being required under the rule to put up £500 security. The case has naturally attracted the attention of both medical and dental professions, and the decision of the Privy Council in the matter will be awaited with interest.

An occasional interesting visitor to the port of Halifax is the French hospital ship, *Sainte Jeanne d'Arc*. This ship is sent out by the Oeuvres de Mer, a French society which volunteers help to seamen, and while intended particularly to provide medical assistance for the crews of French fishing boats which operate on the fishing banks off our Eastern coast, seamen from boats of any nationality are treated. The ship cruises among the fishing fleets, dispensing medical aid wherever it is required. Fishermen are very prone to suffer from injuries to the hands which readily become septic, and for such injuries men are kept on board the hospital ship until the danger of infection is past, when they are returned to their own boats. Cases which cannot be properly treated on board are taken to the hospital at St. Pierre, which is also supported by the Oeuvres de Mer. The ship is able to keep in wireless communication with many fishing craft, especially trawlers. In addition to her mission of mercy, the *Sainte Jeanne d'Arc* provides opportunity for scientific observations relative to the migration of fish and other matters of importance to the fishing industry. Moreover she acts as a mail ship, collecting letters from the fishing boats for transmission from her ports of call, and distributing postal matter entrusted to her at these ports. Included in her personnel is a chaplain, whose services are much appreciated by those to whom he ministers.

W. H. HATTIE

PRINCE EDWARD ISLAND

At a banquet in the Victoria Hotel the medical men of Charlottetown met on April 5th to celebrate the Centenary of the birth of Lord Lister. The Chair was occupied by Dr. James Warburton who was associated with Lister at Edinburgh in the days when he was endeavouring to make surgery safe. In a neat speech he recited many of the incidents in connection with the work of the great surgeon, such as spraying the walls of the operating room with carbolic acid, the dressing of wounds with the same antiseptic and finally his discovery that infection in wounds after operation must be prevented by greater care before operation or in other words aseptic surgery was introduced. He also related the fact that Dr. John Stewart of Halifax was one of Lister's house surgeons at Edinburgh and when a request came from London that he should return to his native city to improve hospital conditions there, he insisted that Dr. John Stewart should accompy him.

Dr. F. W. Tidmarsh read a paper on Lord Lister in which he described the brilliant career of this outstanding surgeon of the nineteenth century. He was a Bachelor of Arts of London University at the age of twenty and a few years afterwards graduated in medicine and became a house surgeon in the University College Hospital. The next thirty years of his life were spent in Scotland where he married Professor Syme's daughter, and where he carried on his great fight against the germ which made wounds septic. He was finally successful and returned to London where he spent the remainder of his life. Foreign nations heaped honours upon him, British universities gave him their highest degrees, he was first created a Baronet, then a Peer and King Edward VII bestowed upon him the highest honour a subject can receive, the Order of Merit. He died in 1912 at the age of eighty-four.

Dr. S. R. Jenkins, through whose activity this celebration took place, spoke of the work of Louis Pasteur. He was the son of a tanner who was one of Napoleon's soldiers. Pasteur was a chemist and by the use of the microscope he began to study the tiniest forms of life known as microbe. Humanity is greatly indebted to Pasteur and Lister for making surgery safe. Pasteur demonstrated the association of micro-organism with disease, and Lister recognizing this germ theory set about to find a remedy to render these germs inactive, eliminating that scourge "hospital gangrene" which caused the death of so many operative cases.

The work of Pasteur and Lister was very closely associated and the world owes these two men a great debt of gratitude.

His worship, Mayor Miller, was present and replied to the toast "The City of Charlottetown."

It was a matter of regret that Lieutenant Governor Heartz and Premier J. D. Stewart were unable to attend.

An extra-mural course of lectures will begin in Charlottetown on May 25th, this will be continued for three days, two in Charlottetown and one in Summerside. Drs. Scrimger and Cushing of Montreal will deliver the lectures.

G. F. DEWAR.

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NEW BRUNSWICK

Early in the month of May, the summer course of extra-mural lectures was inaugurated in New Brunswick by Dr. Walter Barlow and Dr. J. A. Nutter of Montreal. Dr. Nutter spoke on backache in relation to the lumbar and pelvic regions. Dr. Barlow spoke on acute pancreatitis, a subject which he has been interested in for a good many years. As a result of this interest, his paper commanded more than the usual attention.

On May 17th, nine nurses graduated from the Chipman Memorial Hospital at St. Stephen. The speakers of the evening were Mr. F. D. J. Graham, Mayor of St. Stephen, and Dr. Everett Gray.

A unique feature of the annual convocation of Dalhousie University was the holding of a special convocation in a ward of the Victoria General Hospital where Dr. Edmond Leonard McQuade of St. John, N.B., received his degree of M.D., C.M. Dr. McQuade has had the misfortune to contract blood poisoning during the course of his duties at the hospital.

The Commissioners of the General Public Hospital at Saint John, N.B., report the completion of a new hospital pharmacopœia which is now in the hands of the printers. This work has been in the hands of a committee composed of Drs. W. E. Rowley, C. Pratt, and S. H. McDonald. This publication combines the good features of other pharmacopœias in use and makes provision for a complete record of the usual hospital procedures.

Dr. C. M. Kelly has returned to his practice after six weeks' post-graduate work in New York. Dr. Kelly's work this year included further study on spinal and rectal anæsthesia.

On May 4th, at St. John, N. B., the marriage was solemnized of Dr. F. W. Stevenson of the out-door staff of the General Public Hospital to Miss Rhoda Keith, lately assistant anæsthetist at the General Public Hospital.

At the annual meeting of the Campbellton Branch of the Red Cross Society, Dr. D. Murray was elected president for the ensuing year.

The writer of these notes recently had an adequate leave of absence and an almost sufficient supply of funds to allow for a trip from salt water to salt water, across Canada. The journey was accomplished on the excellent trains of our mutually owned Canadian National Railway. On the western journey it was my privilege to have as companions, a well known journalist from Moncton, and an equally distinguished lawyer from Kamloops—the latter returning from a visit to the home of his boyhood in the east. This trio representing literature, law, and medicine, discussed the topics of the day as well as the past, and prospects for the future.

From day to day our group was augmented for short periods by a Reverend Father from Rivière du Loup; two fatigued senators returning west after their labours at Ottawa; one farmer member of the House of Commons, going west on a fence-mending tour; a mining engineer destined for Swastika, and the gold-fields of Northern Ontario; a promotor of the asphalt company, located at Fort McMurray; and the owner of a department store from Vancouver travelling with a local treasurer for the Canadian National Railway.

This shifting group changing in personnel day by day, lunched, smoked, walked, and chiefly talked together during the entire trek of over three thousand miles. Some time during the winter I had read the threadworn description of Canada stating that "Our Country is three thousand miles long and fifty miles wide." This facetious libel is rapidly losing everywhere even a similitude of truth as one hears and sees the continued advances of miners, lumbermen, hydro-engineers and farmers, into the more northern marches of our country. The encroaching advances of civilization on the so-termed frozen north are everywhere visible, from Lake St. John in Quebec, through North Ontario, and Manitoba, to the Slave Lake in Alberta and the Peace River Country in British Columbia.

Where opportunity offered, medical friends were visited. All were working hard, hoping for much but receiving little. Medical opinion, as usual, differed on many points but all were agreed that the extra-mural lectures, sponsored by the Canadian Medical Association, were probably the best feature of Canadian Medicine to-day.

On my departure from the east where in medical circles, poverty is almost a badge of worth, I fondly hoped to find my western friends more wealthy but I am forced to record the fact that out of the many I met with or heard of, few could be classed as rich; this in spite of the manifest prosperity of other classes of citizens. So I returned to my allotted task assured that the practice of medicine must be its own reward and as a matter of fact, that it is well worth it at that.

A. STANLEY KIRKLAND

QUEBEC

The annual dinner of the Lafleur Reporting Society was held on Saturday, May 14th, 1927, at the McGill Faculty Club. Professor Jonathan C. Meakins, who was the guest of the evening, spoke on the history of medicine in Canada, and the part McGill University had in the institution of the present methods of clinical teaching. The society was honoured with the presence of Dr. H. A. Lafleur, its Patron and Life Member, who, in a delightful talk, expressed his satisfaction with the year's activities of the Society and its future.

The campaign conducted in Montreal under the chairmanship of Mr. J. W. McConnell for $4,000,000.00 has just been concluded with the most satisfying results. The total subscriptions will amount to over 4,700,000.00; the number of individual subscriptions are in excess of 11,000 and to these must be added some 50,000 or 60,000 subscriptions of employees, contributed under the name of the business firms.

This money which is payable over a period of four years will be used for the following objects:

The discharge of the accrued deficit of the two hospitals up to December 31, 1926.

The paying off the balance due on the new Maternity Hospital and the Montreal General Hospital Nurses Home.

The building and the equipment of a new private ward building, and additions to the public wards and out-door departments of both hospitals.

The result is most gratifying and shows the interest taken by the people in the work of the hospitals and the appreciation of the benefits conferred on the city during the many years that the hospitals have been in existence.

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XUM

ONTARIO

The Academy of Medicine, Toronto.—The twentieth annual meeting of the Academy was held at the Academy building on the evening of May 3, 1927. The reports from the various officers and committees showed a most gratifying increase in the Fellowship of the Academy, the present membership being 862.

The Library, which has shown a steady yearly increase, now contains some 18,500 volumes and over 250 current medical journals. As the largest medical library in Ontario and the second largest in Canada, it has proven of great advantage not only to the Fellows of the Academy, but also to the Provincial University and the medical profession at large.

During the past year the activities of the Academy have materially increased. A new Section of Anæsthesia was formed to consider problems peculiar to this branch of medicine.

The Academy of Medicine telephone exchange is now available to all Fellows of the Academy. This is of particular advantage to the public who, in all cases of emergency, are thus enabled to get in touch with their own physicians without delay.

During the past session, very interesting and varied programmes were presented at the stated and sectional meetings, and subjects of particular interest to the profession and public alike were discussed. The Academy was specially fortunate in hearing addresses from many distinguished physicians and surgeons from Great Britain and the United States, including Sir Henry Gauvain of Alton, England, Sir Ewen Maclean of Cardiff, Wales, Mr. W. Sampson Handley of London, Mr. D. P. D. Wilkie and Mr. John Fraser of Edinburgh, Dr. Jas. Gwathmey, Dr. W. S. Bainbridge, and Dr. Bela Schick of New York.

A number of clinical meetings were arranged at the various hospitals of the city and cases presenting problems in diagnosis and treatment were freely discussed by the Fellows.

The Academy offers to its Fellows an opportunity of keeping themselves informed of all the latest advances in their profession, and has been the medium chosen for a number of communications dealing with original work done in Toronto which marked advances of the very highest value.

The retiring President, Dr. A. J. Mackenzie, was the recipient of many favourable comments on the success of his occupancy of the presidential office.

The election of new officers and Members of Council for the coming session resulted as follows:—

President, Dr. J. H. McConnell.
Vice-President, Dr. F. W. Marlow.
Honorary Secretary, Dr. R. S. Pentecost.
Honorary Treasurer, Dr. Brefney O'Reilly.
Members of Council:
Drs. H. B. Anderson,
J. L. Burns,
G. S. Foulds,
F. C. Harrison,
S. Johnston,
Geo. Laughlen,
Wm. Magner,
E. A. McDonald,
R. T. Noble,
Jos. Graham, Chairman Section of Medicine,
Jas. Simpson, Chairman Section of Surgery,
Oskar Klotz, Chairman Section of Pathology,
R. J. P. McCulloch, Chairman Section of Ophthalmology,
N. King Wilson, Chairman Section of Oto-Laryngology,
A. L. McKay, Chairman Section of Preventive Medicine and Hygiene,
M. A. Cox, Chairman Section of Pædiatrics,
W. G. Cosbie, Chairman Section of Obstetrics and Gynæcology,
H. J. Shields, Chairman Section of Anæsthesia.

R. S. PENTECOST (*Hon. Sec.*).

Through the efforts of the Women's Institute, the Provincial Health Department, and the Provincial Red Cross, there has been appointed a resident physician at Tobermory at the extreme northern point of the Bruce Peninsula. Since the Bruce Peninsula was settled, some 60 years ago, there has been no physician nearer than Wiarton.

The new building for the school of hygiene of the University of Toronto will be opened on Thursday morning, June 9th, by Sir George Newman, K.C.B., chief medical officer of the department of health for England and Wales. Sir George will deliver a lecture on, "Medicine as a science to be learned in laboratory and field". The new school is a gift of the International Health Board of the Rockefeller Foundation and was built under the direction of the department of health of the Ontario Government and the University of Toronto. The new school is one of three which have been established in North America by the Rockefeller Foundation, the others being at Johns Hopkins and Harvard. Dr. J. G. Fitzgerald, the professor of hygiene, as director of the Connaught Laboratories, will be director of the new school of hygiene. The building will accommodate the department of hygiene and preventive medicine, the Connaught Laboratories and the department of Public Health Nursing of the university.

Dr. Velyien Henderson addressed the out-patient's staff of the Toronto General Hospital, at their monthly meeting, taking as his subject prescription writing.

N. B. GWYN

MANITOBA

Dr. C. R. Gilmour who has been Chief of Staff and Chief of Medicine in St. Boniface Hospital has resigned. At the clinical luncheon of the St. Boniface Hospital staff on April 27th many references were made to the value of Dr. Gilmour's services to the hospital and to medical education. He was presented with a gold cigarette case from the members of the staff.

Applications are being received for staff appointments in medicine, surgery, obstetrics and gynæcology, and eye, ear, nose and throat at St. Joseph's Hospital. The first clinical luncheon of this hospital was held on April 26th and will continue to be held on the fourth Tuesday of each month.

Dr. J. B. Ritchie of Regina was a visitor to Winnipeg at the end of April on his return from California.

The Winnipeg Medical Society presented a very interesting programme on April 19th. "Squint in

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children before and after treatment" (lantern slides), Dr. C. M. Clare; "Medical ethics," Dr. S. W. Prowse; "Specialism," Dr. J. D. Adamson. There was an animated discussion on each of the papers.

At the recent Musical Festival in Winnipeg, a choir from the training school of the Winnipeg General Hospital took second place in Grade B Ladies' Choirs and received high praise from the adjudicators.

Tenders have been let for the construction of a nurses home at St. Boniface Hospital. It will be five storeys in height and connected with the hospital by a tunnel.

The Governor-General of Canada, Lord Willingdon, formally opened the new wing of Grace Hospital, Winnipeg, on Sunday, April 24th. The vice-regal party were met at the entrance of the hospital by Commissioner Rich, Dr. May Whittaker, Superintendent, and members of the medical staff. Lady Willingdon was especially interested in a pair of twin babies. The hospital is fitted to do general surgical as well as maternity work. A McKesson nitrous oxide-oxygen apparatus has recently been added to the equipment.

The *Manitoba Medical Journal* for April contains an interesting but very brief account by Dr. A. K. Haywood of the growth of the Montreal General Hospital showing its development from a small house opened by the Montreal Ladies Benevolent Society in 1818, to supply food, shelter and medical aid to newcomers, to the present large and busy institution with an outstanding position amongst hospitals on this continent.

There is also the reprint of a lecture by Dr. Kerr delivered in the year 1883 to the members of the Manitoba Medical College. In this he sketches the incidents which led to the foundation of this college, and also sounds a note of warning as to beginning too early to specialize in medicine which has a strangely familiar sound even at the distance of 44 years.

ROSS MITCHELL

ALBERTA

Dr. Rush of Edmonton has just returned from a trip to Japan and China. Dr. Rush went as temporary surgeon on one of the Blue Funnel Boats. He reports conditions as unsettled at present but anticipates that eventually order will come out of chaos and stable government be established in China.

Edmonton Academy of Medicine.—At a well attended meeting of the Edmonton Academy of Medicine held May 4th, a symposium was given by specialists in children's diseases. (1) "Lantern slides of unusual medical cases, illustrating some rare congenital defects," by Dr. F. J. Folinsbee. (2) "Infantile tetany," by Dr. Leitch. (3) "Poliomyelitis," by Dr. Swallow.

T. H. WHITELAW

Alberta Department of Health, Travelling Health Clinic.—This clinic, instituted by the Hon. Mr. Hoadley, Minister of Health, and which has met with success during the past two years, is organizing on a much larger scale this year and starts out on May 15th, to visit 120 rural communities, which have made voluntary requests for it. In communities where there is a physician, he will be invited to participate, with remuneration, in the work of the clinic.

Arrangements have been made for a medical inspection of school children during the visit of the clinic. The clinic personnel will examine any person, free of charge; but a nominal charge is made for minor operations, viz., $15.00 for tonsillectomy, but no charge is made in the case of those unable to pay. The personnel consists of a physician, an anæsthetist, a dentist and two nurses. A second physician follows up to remain on call in the community for 24 hours in case of any emergency complications following any minor operation.

A follow up scheme is being organized to distribute literature and advice, based on the discretion of the clinic personnel. The clinic will be out for about four or five months. Two automobiles will be used and equipment for minor surgical work will be carried as well as health posters and literature.

Dr. R. R. Paul, formerly of Youngstown, is now practising at Cadogan.

Dr. A. E. Ward, of the University Hospital, Edmonton, has accepted an appointment with the Royal Canadian Mounted Police at Aklavik, which is situated at the mouth of the McKenzie River, Northwest Territories.

While Dr. G. M. Little of Viking is in the east pursuing post-graduate studies, his practice is being looked after by Dr. E. L. Little, formerly of Veteran.

Dr. F. W. Moore of Strathmore has recently accepted a contract with a coal mining company at Mountain Park on the coal branch west of Edmonton.

Dr. J. S. Sutherland of Alix has left for the coast to take up practice either in British Columbia or one of the Western States.

Dr. Mark R. Levey, who graduated from the University of Alberta in 1926, is now in Vienna engaged in eye, ear, nose and throat work. He will be associated with Dr. R. B. Wells of Edmonton on his return.

Dr. W. T. Rush, formerly of Lamont, has returned from a trip to the Orient. He will engage in *locum tenens* practice for a time before going to the coast.

Dr. R. J. Morrow of Picardville has accepted an interneship at the Harper Hospital, Detroit, Michigan.

Dr. C. G. Bain, formerly of Tofield, is now at Rochester, Minnesota, having obtained a Fellowship in Surgery on the Mayo Foundation Graduate School, University of Minnesota.

Dr. Salton McGibbon of Edmonton is now in Germany engaged in eye, ear, nose and throat post-graduate work.

Dr. H. A. Robertson, of Banff, left recently for China and Japan, and will be absent for several months.

The Provincial Department of Health inaugurated a travelling clinic several years ago for the purpose of visiting outlying districts, where there were no physicians or dentists. This year the department decided to extend this work. All the school districts and municipal districts apart from the cities were circularized and letters were sent to all branches of the United Farm Women,

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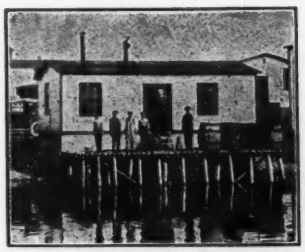

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Women's Institutes and all branches of the Red Cross describing the work of this clinic.

The fear is generally expressed that the department has overlooked the fact that post-operative attention is frequently required, and that the failure to give this care may have serious results.

With the inducement of greatly reduced fees in tonsillectomies and adenectomies as well as in minor surgical operations and in dental work held out to every dweller in the country districts, the local physicians and dentists undoubtedly will suffer. To an unbiased observer it looks as though the Farmer Government has attempted to put into action a measure which looks strangely like a type of state medicine. This action will unquestionably bring about a reaction.

The second of this year's series of extra-mural post-graduate lectures in Alberta under the auspices of the Canadian Medical Association will commence June 27th, and will extend to July 7th, when various cities and towns will be visited. Professors Fitzgerald and Oille of Toronto University will conduct these courses which will include a number of subjects pertaining to preventive medicine and diseases of the heart.

According to the *Bulletin* issued by the College of Physicians and Surgeons of Alberta, a professional Collection Agency has been established in Calgary for the purpose of collecting physicians' accounts. The company is bonded to the College of Physicians and Surgeons of Alberta to the extent of two thousand dollars. The Council is not assuming any responsibilities whatever in the matter of such collections and each physician will make his own arrangements with this organization.

During the past session of the Alberta Legislature, amendments were added to the Dental Association Act in the Amendment to this Act 1927. Among the provisions is the following: "Nothing in this Act contained shall affect the privilege conferred upon physicians and surgeons by any act relating to the practice of medicine and surgery in this province; but no physician or surgeon shall practise restorative or prosthetic dentistry without having passed such examination therein as may be prescribed by the University of Alberta." Amendments were also made to the Municipal Hospitals Act, to the Improvement District, and to the Town Acts regarding indigent sick persons and to the Coroners Act.

G. E. LEARMONTH

BRITISH COLUMBIA

Dr. R. P. Kinsman, late of Anyox, B.C., has returned to Vancouver after spending a considerable time doing post-graduate work in St. Louis, Iowa City and Chicago.

Dr. R. E. Ziegler of Campbell River, Dr. Roy Walker of Logan Inlet, Dr. J. H. Carson of Premier and Dr. W. J. Lightburne of Hazelton were visiting Vancouver in April and May.

Dr. Philip H. Kreuscher, Clinical Professor of Orthopædics at Loyola University was a visitor to Vancouver at the beginning of April and gave an interesting address on "Fractures involving joints" before the Vancouver Medical Association, illustrated by lantern slides.

The annual meeting of the Vancouver Medical Association was held on April 19th, when the new officers were elected. Dr. A. B. Schinbein was unanimously elected President, with Dr. Walter Turnbull as Vice-President. Dr. Anson C. Frost and Dr. G. F. Strong were elected Treasurer and Secretary respectively. Dr. J. M. Pearson, who has been Editor for the Association for many years and now guides the destinies of the *Bulletin* was again elected Editor for 1927-1928.

Dr. Robert Crosby left Vancouver at the end of April for England where he intends to do post-graduate work.

Dr. Norman M. Thornton, who was for some time on the staff of the Vancouver General Hospital and has made several voyages as surgeon on the *Empresses*, has just returned to British Columbia from Europe.

The final University of Manitoba examinations for those undergraduates who are serving in hospital positions in the west are at present being held at the University of British Columbia.

Dr. Fred. Brydone-Jack is now in England after spending the last few months in Vienna in post-graduate work. After a short visit to Scotland the doctor will return to Vancouver about the beginning of June.

Dr. Malcolm T. MacEachern was a recent visitor in Vancouver from Chicago.

Dr. Isabel Day is leaving shortly for Toronto to visit her home and to do some post-graduate work in obstetrics. She expects to be away about two months.

Dr. R. D. Forbes of Seattle addressed the Victoria Medical Society at the February meeting, taking for his subject "Some surgical conditions" which he illustrated with lantern slides. Dr. Thomas McPherson, the President, presented the thanks of the society to him.

The March meeting of the Victoria Medical Society was largely attended. Dr. B. D. Gillies of Vancouver gave an interesting address on "Some heart conditions" and lucidly explained the newer knowledge of cardiac conditions and the more recent developments in examination procedure.

The Victoria Medical Society had at its May meeting as special visitor and speaker Dr. J. G. MacKay of Vancouver. Dr. MacKay's subject "Paranoidal states of interest to general practitioners" allowed him an opportunity to give the members much valuable practical information.

The visit of Professor J. J. R. Macleod of Toronto University to Victoria was the occasion for two well attended lectures by this able teacher. These lectures were held under the extra-mural post-graduate scheme of the Canadian Medical Association. At an evening meeting held in the Library Room Professor Macleod's subject was, "Metabolism" and on the following day at luncheon at the Empress Hotel the members were again much interested by an address by him on the place of "Physiology in medicine". The appreciation of the Victoria profession was evidenced by the vote of thanks and the ovation accorded their guest and speaker.

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We are grateful to Professor Macleod and also to the Canadian Medical Association for such excellent post-graduate instructions.

An event of much interest is slated for May 14th, when international medicine will meet in a golf contest on the Colwood Course, Victoria. The Seattle golfers will meet the combined players of the Vancouver and Victoria Medical golf clubs. Keen interest is shown in these contests and medicine is put aside to allow time for training in preparation for the tournament.

J. EWART CAMPBELL

UNITED STATES

The Commission on Medical Education will be glad to supply a copy of the "Preliminary Report of the Commission on Medical Education" without charge to any member of the profession in Canada who may be interested in the general question of medical education and practice. The address is: Commission on Medical Education, 215 Whitney Avenue, New Haven, Conn.

Book Reviews

Diathermy, with Special Reference to Pneumonia. Harry Eaton Stewart, M.D. 12 mo. Pages xx, 228, 45 illustrations. Price $3.25. Second edition. New York, Paul B. Hoeber Inc., Canadian Agents, Macmillans, St. Martin's House, Toronto, 1926.

Since the publication of the first edition in 1923 the author has had further clinical experience with diathermy in pneumonia. He is quite convinced that improved technique is showing better results. He draws his conclusions from a series of about 250 cases. The influenzal, post-operative, and hypostatic pneumonias have not responded satisfactorily to this method of treatment. An increasing number of hospitals and private physicians are using diathermy which appears to have a distinct place in the therapy of pneumonia. There is a careful description of the apparatus recommended, with the technique of its application in pneumonia and in various surgical conditions, and directions have been added for the treatment of children.

J. H. ELLIOTT

Nerves: Master System of the Body. David Fraser-Harris, M.D., D.Sc., F.R.S.S. (The Modern Health Book Series). 222 pages, 14 illustrations. Price 3s. 6d. net. Faber and Gwyer, 24 Russell Square, London, W.C.1, 1927.

The author of this little book is well known to many Canadians, as he was for several years Professor of Physiology at Dalhousie University, which he represented on the Medical Council of Canada. By acquaintances, he is famed for his industry, thoroughness, breadth of view and facility of expression. The reviewer, therefore, takes up the book with the assurance that its perusal will reveal a comprehensive, well-balanced, aptly phrased and intensely interesting presentation of the subject; and he is not disappointed. The book is the last of a series, which the author has edited, designed to set forth the established facts relative to the problems of health in such a way that they may be readily understood. Dr. Fraser-Harris reserved to himself the subject most difficult to present in easily comprehensible form. He has succeeded in producing a book which, while much more than elementary, can be read and understood by anyone who wishes to obtain an intelligent conception of the master system of the body. It is a book, moreover, which is very serviceable to others than laymen. Physicians will find in it an admirable résumé of the outstanding facts relative to the physiology of the nervous system, and will gain from it much useful information concerning factors in the production of nervous disorder and the means of conserving and restoring neural health. It is well printed, attractively bound, and offered at an astonishingly low price. This book is not to be confused with another on "Nerves", by the same author, which appeared some years ago in the Home University Library.

W. H. HATTIE

Finlayson's Clinical Manual for the Study of Medical Cases. Fourth edition. Edited by Carl H. Browning, M.D., E. P. Cathcart, M.D., F.R.S., and Leonard Findlay, M.D., D.Sc. 815 pages, numerous illustrations and 3 coloured plates. Price 18/- net. G. Bell & Sons Ltd., London, W.C.2, 1926.

Many of the older members of the medical profession will no doubt remember the Finlayson's Clinical Manual of their student days—the last (third) edition having been published thirty-five years ago. The present (fourth) edition is edited by Professors C. H. Browning, E. P. Cathcart, and Leonard Findlay, and the various sections have been completely revised by well chosen collaborators.

The reason for this new edition after so long an interval is stated in the preface. The editors believe that the multiplicity of bacteriological and chemical diagnostic methods "has proved a source of much confusion to the student, and there is the danger that injudicious reliance on laboratory tests may soon place clinical diagnosis among the lost arts". Consequently only those diagnostic tests are incorporated which can be carried out in the wards or small attached laboratories. For instance, the significance but not the technique of the Wassermann reaction is given, whereas the technique for van den Burgh's, the Shick, and the Dick tests are presented in detail. Laboratory aids to diagnosis are discussed "from the point of view of an addition to, not a substitute for, the ordinary methods of clinical examination". In this manner the practical clinical nature and philosophic spirit of the original Manual is retained.

With the exception of a page on basal metabolism, Dr. William Gairdner's classical chapter on the physiognomy of disease has been retained as originally written. There is one completely new article on disease of the glands of internal secretion written by Professor Cathcart in which the ground is broadly covered. A feature of the book is the section on the eye which has been well revised by Dr. A. Maitland Ramsay. The remaining articles are thoroughly up to date and well written. The volume is adequately illustrated throughout and there is a variety of useful height and weight tables at the end.

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original it should prove a valuable clinical guide to students, internes and the profession generally.

C. J. TIDMARSH

Text-Book of Bacteriology. Hans Zinsser, M.D., and E. E. Tyzzer, A.M., M.D. Sixth edition. 1053 pages, 181 illustrations. D. Appleton & Co., New York, 1927.

The sixth edition of this standard text-book is dedicated to the memory of Professor P. H. Hiss, who was associated with Professor Zinsser in the preparation of previous issues.

The new volume is larger than its predecessors, and the subject matter has been extended to include practically every topic connected with medical bacteriology. The object of the authors has been to develop a "Manual of Infectious Diseases" rather than an academic treatise on the biology of bacteria. They have not hesitated to discuss at length problems of diagnosis, specific therapy and prevention. Hence the work includes not only the detailed biological characteristics of those micro-organisms which are pathogenic in man and animals, but it also sets forth the established facts regarding their actions and interactions with the living organism, as well as information regarding their cycles of growth and life, so important in the prevention of the spread of disease.

Although the book continues to draw away from pure botanical bacteriology, it remains an excellent guide for the practical bacteriologist. Adequate technical details are given for all the common disease-producing germs, and references to the sources of special information are conveniently placed in the text. One chapter is devoted to a concise exposition of modern ideas upon infection and immunity. This topic is discussed at length and with a tone of authority. Details of therapy by vaccine, serum and protein (specific and non-specific) are given, followed by a discussion of the phenomena of hypersusceptibility.

Of general interest are the new sections upon the bacteriology of scarlet fever, and whooping cough, and further details regarding bacteriophages and pathogenic fungi. Students of public health will find a large part of the work concerned directly or indirectly with this important specialty.

Professor E. E. Tyzzer contributes the chapter upon those parasitic protozoa which cause diseases in man, with remarks upon their biology, and methods of detection and identification.

In spite of the many additions the book is kept a convenient size by the avoidance of detail, frequent references being given for original articles. The historical method is used where possible, creating interest in subject matter, which sometimes tends to become arid, and reciting many stimulating stories of effort, failure or progress in the science of infectious diseases.

R. R. FITZGERALD

Mother and Unborn Child. Samuel Raynor Meaker. 198 pages, 22 illustrations. Price $2.50. Williams & Wilkins Co., Baltimore, 1927.

This is a well-written, carefully indexed book of something over two hundred pages, which is printed on rather cheap paper. The teaching is, on the whole, sound; and expressed in simple terms.

The book first deals with the anatomy and physiology of the female pelvis, the text being clarified by illustrations. Then the development of the embryo, the signs and symptoms of pregnancy, and the hygiene of pregnancy are discussed. The fallacy of many of the old tales such as maternal impressions, is pointed out. Some of the discomforts of pregnancy, as vomiting, flatulence, constipation, etc., are enumerated by the author, and their significance and treatment pointed out. The seventh chapter closes with a most concise yet complete list of rules for expectant mothers. The last quarter of the book deals with labour, the preparations necessary, the care of the new-born child and of the mother.

The book is written in fairly simple terms for the use of mothers who wish to understand the processes of pregnancy. In recommending the book to patients, one would have to discriminate, for some would be unnecessarily alarmed by reading the chapter on labour, while others would weary over the anatomy and physiology and not read further.

ELEANOR PERCIVAL

The Inflammatory and Toxic Diseases of Bone. R. Lawford Knaggs, M.C., F.R.C.S. 416 pages, 196 illustrations. Price 20/- net. John Wright & Sons, Bristol. The Macmillan Co. of Canada, Toronto, 1926.

A book maintaining the best traditions of the English school of surgical teaching; an erudite book; one which will elicit the gratitude of all interested in the subject, for it throws a welcome light into a part of surgery too long obscure.

The book bears abundant evidence on page after page of the care with which the writer has accomplished his work. The references to the works of others are well and carefully chosen. The reader has the best of them pointed out to him, and the error of their useless multiplication is avoided.

Some museum specimens are illustrated; many are described in detail macroscopic and microscopic; all of them are referred to by the numbers they bear in the catalogues of their respective museums. The Royal College of Surgeons of England naturally furnishes the bulk of these specimens, but there are many from the museums of hospitals and medical schools all over England.

Your reviewer feels that this book does fill a long-felt want. The subject is one about which too much uncertainty exists in the minds of students and practitioners. The book collates the knowledge available at present on the subject, and simplifies the whole so that the student will find many of his difficulties and perplexities cleared away as he reads.

The commoner forms of inflammation of bone are well described with numerous excellent illustrations from specimens and clinical cases. It is however with the less common affections that the book deals so admirably and usefully. Thus Paget's quiet necrosis, pseudo-coxalgia and tarsal scaphoiditis are outlined simply and clearly, and their inter-relation traced. Osteo-arthritis and rheumatoid arthritis are differentiated, but the description of the latter seems inadequate and unsatisfactory even in the present nebulous state of our knowledge of the condition. There is a very thorough and valuable chapter on spondylitis deformans.

The most interesting and striking part of the book, however, concerns itself with osteitis fibrosa, osteitis deformans, and osteomalacia. Here the connection traced between the first two diseases attracts attention at once; but when the author goes on to call osteomalacia a third type of expression of the same disease which is manifested in osteitis fibrosa and osteitis deformans, then the reader may be surprised. Nevertheless the argument is well supported by histological evidence, and is put forward in a manner which commands respect and admiration.

The obscure series of diseases hidden under the term leontiasis ossea are classified into two main groups, and the clinical types made clear even if their etiology be left wrapped in mystery.

The author must be congratulated on the production of a volume which will make easier the hard path of the senior student, and will be essential in his preparation for higher examinations. The book moreover, deserves to find an honourable place in the library of every surgeon.

W. E. M. MITCHELL

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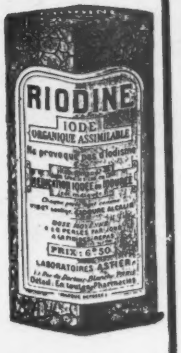

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Applied Refraction. Homer Erastus Smith, M.D., Assistant Surgeon Manhattan Eye, Ear and Throat Hospital, New York. 131 pages, 9 figures. Price $2.75. William Wood & Co., New York, 1927.

A readable book for the busy oculist who wishes an evening's diversion. It gives an intimate insight into a brother refractionist's workaday world and the methods he found most satisfactory in dealing with his clientèle over a period of thirty years.

While there is nothing new or revolutionary in the contents, still there is much food for thought if one wishes to be controversial minded.

Upon occasions the author is inclined to become facetious which rather jars one's sense of the fitness of things.

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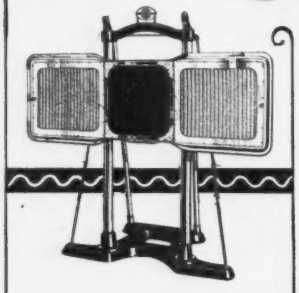

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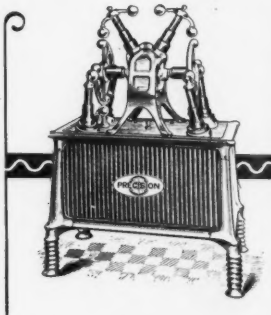

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